CEO Pet Projects*

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Abstract

Using hand-collected data on CEOs' personal assets, we find that CEOs prioritize corporate investment projects that increase the value of CEOs' private assets. Such pet projects are implemented sooner, receive more capital, and are less likely to be dropped. This investment strategy delivers large personal gains to the CEO, but selects lower NPV projects for the firm and erodes its investment efficiency. Using information from CEOs' relatives as an instrument for the location of their private assets, we argue that these effects are causal. Overall, we uncover CEOs' private monetary motives in capital budgeting decisions.

JEL Codes: G30, G34, G41

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Academic theory and corporate finance textbooks usually define the main task of a firm's CEO as selecting investment projects that maximize the NPV. Yet a central tenet in the agency theory is that some investment projects deliver private benefits to the CEO and drive a wedge between the incentives of managers and shareholders. The theoretical literature in corporate governance has pegged such investments as CEO pet projects. While CEO pet projects have become a staple in the agency theory, identifying them empirically has been elusive because such an analysis would require observing the opportunity set of possible investment projects, evaluating their value to the firm, and identifying their private benefits to the CEO.

This paper is one of the first to offer a granular analysis of CEOs' private monetary gains from corporate investment projects and to study how such incentives affect the selection, implementation, and sequencing of project-level investments. We study over 229,000 investment projects (with a combined investment near $1 trillion) overseen by 412 CEOs in the oil and gas (O&G) industry where we can observe the costs, cash flows, and execution schedules for each project. As a source of variation in the CEOs' private incentives, we exploit their personal ownership of investment land, whose value is strongly influenced by the exploration of fossil fuels. For example, the initiation of an O&G exploration project within a 3-mile radius from a private land lot is associated with a mean increase of 92% in its mineral rights value.

CEOs' private investments in land lots near O&G fields are common and economically important. Over 22% CEOs in our sample own investment land in O&G exploration regions, after excluding the CEOs' primary homes and residential investment properties. The large increase in the value of royalty payments and mineral rights that occurs after the start of resource extraction acts as a powerful monetary lever to explore the role of CEOs' private benefits in corporate decisions.

Our first result is that a firm is nearly three times more likely to initiate an exploration project in an oil field where its CEOs owns investment land than in an observationally similar field in the same region. Firms also tend to enter such fields more quickly and invest in them more aggressively. This empirical pattern could have several interpretations. According to the information hypothesis, the CEO has superior information about the quality of fossil reserves near his personal investment properties. This hypothesis predicts that the wells drilled near the CEO's personal investments should have higher productivity and lower dispersion in financial outcomes, consistent with the CEO's superior information. Alternatively, according to the agency hypothesis, the CEO shifts the company's drilling activity to O&G fields near his personal investments to realize private gains from land appreciation driven by the initiation of drilling. If such a shift prioritizes the CEO's personal interests over those of the shareholders, the wells near the CEO's personal investment properties should, all else equal, be less productive and have lower NPVs.

Our main findings support the agency hypothesis. When a firm enters an O&G field encompassing its CEO's personal investment properties, such investment projects underperform. For example, wells drilled in the field near the CEO's investment properties produce 11.8% lower output and deliver 31.8% lower estimated NPVs than other projects of the same firm with similar characteristics. These economic estimates are robust to absorbing time-invariant heterogeneity across firms, CEOs, and regions, as well as accounting for an array of granular control variables at the project level, such as project characteristics, proximity to headquarters, and geological composition of fossil fuels. These results also persist after controlling for unobservable factors affecting a given firm or a given state during the year, which are absorbed by firm∗year and state∗year fixed effects, respectively.

Since the location of a CEO's land investments is non-random, we develop an instrumental variable for the CEO's decision to purchase land in a given region by exploiting the idiosyncratic component in the geographic location of his relatives, such as siblings, adult children, and in-laws. Such an instrument serves as an important factor explaining the location of the CEO's land investments (F-statistics = 11–12). We show that CEOs are more likely to purchase investment land in the oil fields near their relatives' residences (within 20 km), while the towns of residence of the CEO's relatives are plausibly unrelated to a firm's investment opportunity set. Using this idiosyncratic source of variation in the location of the CEO's personal properties, we show that the effect of CEO pet projects on the selection and prioritization of corporate investment is plausibly causal. We also replicate our findings by focusing on the CEOs' investment properties acquired prior to the discovery of the shale gas technology, where the choice of the land investments was likely exogenous to the fossil deposits that were yet-to-become commercially viable.

As an additional test to address property selection, we focus on investment properties bestowed upon CEOs as inheritances. This experiment endows the CEO with properties in a particular region at an idiosyncratic time of a relative's death, effectively muting the CEO's input in property selection. By focusing on endowed properties, this test shuts down the possibility of reverse causality, where a firm's investment could affect the CEO's property choice.

The CEO's private incentives from personal land ownership increase the intensity of corporate investment and reduce its sensitivity to project-level information. Using project-level data on production, investment, and cash flows, we show that CEO pet projects are associated with lower investment efficiency for the firm and a weaker response to new project-specific information revealed in the investment process. For example, when a CEO owns personal land in an oil field, the firm invests 6.8 percentage points more in the exploration of the field, and this investment becomes less sensitive to information about a project's investment opportunities revealed in the early years of its implementation.

To further distinguish the effect of CEO pet projects on corporate investment, we offer micro-level evidence that exploits geospatial variation in the location of a CEO's investment lot within each oil field, while controlling for township∗year and firm∗year fixed effects. This specification captures all changes in economic variables affecting a firm's activity in a given exploration region (township radius ≈ 3 miles), including changes in local investment opportunities, technological discoveries, regulation, and firm's annual investment policy, among many others. These results set a high bar for a possible omitted variable, which would need to generate the same granular variation in a firm's investment activity within each oil field, while being unrelated to the CEO's private interests.

In another test of geospatial variation, we show that the tendency of CEOs to prioritize investment in projects with private benefits is distinct from a local bias. Our results are robust to controlling for the distance between an investment project and the firm's headquarters, as well as for the CEO's state of origin (inferred from his social security number) and his state of residence, using CEO∗state fixed effects.

While CEO pet projects appear to introduce frictions into a firm's investment policy, they deliver large private gains to the CEO. Using proprietary data on the leasing terms for the owners of land in O&G fields, we show that the initiation of drilling within a 3-mile radius from the average land lot is associated with a 92% increase in the value of mineral rights and an increase in the royalty rate equivalent to an extra $74,000 in the present value of annuity payments for each future well drilled on the lot. Thus, the initiation of resource extraction yields large personal gains to the landowners, even after these deposits are discovered and documented. Since the mean CEO investment adjacent to an O&G field exceeds $1 million, the project initiation triggers an economically important increase in the value of the CEO's personal assets.

Overall, our findings line up closely with the predictions of the classical agency theories about CEO pet projects. For example, Jensen and Meckling (1976) and Jensen (1986, 1989, 1993) postulate that managers invest in pet projects when they have more free cash flow, face loose monitoring, and possess stronger control rights. Our evidence supports these predictions. First, CEOs of oil extraction firms are more likely to invest in pet projects during periods of high oil prices, which increase free cash flow and managerial slack. Second, the underperformance of pet projects is more pronounced when the CEO has stronger control rights (chairman of the board) and faces weaker monitoring (less concentrated shareholder ownership). Third, the underperformance of CEO pet projects is stronger at public rather than private firms, consistent with a starker separation of ownership and control at publicly traded firms.

The central contribution of this article is to provide the first evidence on how the CEO's personal investments affect the selection and implementation of corporate investment projects. We show that CEOs skew corporate investment towards projects that offer private monetary gains, and this practice dampens investment efficiency. Our findings add to three research strands: (1) CEOs' personal assets, (2) CEOs' private incentives and investment decisions, and (3) financial policies in the O&G industry.

We add to an emerging stream of work that studies the link between CEOs' personal assets and corporate decisions. Since CEOs' personal investments are unobservable in standard datasets, this literature is only beginning to expand our understanding of CEOs' private assets. Liu and Yermack (2012) examine CEOs' transactions in their primary homes and find that CEOs' purchases of luxurious estates are followed by a decline in their firm's performance, consistent with CEO entrenchment. Ben-David, Birru, and Rossi (2019) study stock investments of CEOs and other executives in the discount brokerage data and find that they earn positive abnormal returns. Duchin, Simutin, and Sosyura (2021) show that CEOs come from wealthy backgrounds and are endowed with significant family assets. To our knowledge, our paper is among the first to study how CEO's personal investments affect their corporate investment decisions.

Direct evidence on CEO pet projects has been scarce due to the difficulties in identifying such projects and evaluating their outcomes. Prior work has studied CEOs' private benefits in the context of firms' investments in corporate jets, finding mixed evidence. On the one hand, some studies suggest that such investments reflect excessive CEO perquisites. Yermack (2006) shows that firms disclosing the CEO's personal use of the aircraft experience lower stock returns, and Edgerton (2012) finds that firms with stronger governance have smaller aircraft fleets. On the other hand, several authors argue that the CEO's use of the corporate jet yields shareholder benefits. Rajan and Wulf (2006) find that corporate jets are prevalent at firms where they are likely to increase managerial productivity, and Giroud (2013) shows that an improvement in the management's travel access to manufacturing plants enhances investment efficiency. Cronqvist and Fahlenbrach (2013) find no changes in the CEO's personal aircraft use after the firm becomes owned by strong principals (private equity sponsors), in contrast to the agency hypothesis. The lack of consensus in this literature highlights the challenges in singling out pet projects and evaluating their effect on firm value. To address these challenges, we identify an array of standalone projects with private benefits to the CEO and juxtapose them to their close substitutes under the same CEO and at the same firm.

More broadly, we also add to research on how CEOs' private incentives affect their investment decisions. So far, this literature has mostly examined CEOs' investments in the context of mergers and acquisitions (M&A). Target company CEOs accept lower acquisition premiums for their shareholders when CEOs obtain large payoffs (Hartzell, Ofek, and Yermack 2004; Fich, Cai, and Tran 2011) or executive jobs (Wulf 2004). CEOs also reap non-pecuniary benefits, such as retirements (Jenter and Lewellen 2015) and hometown benefits (Jiang, Qian, and Yonker 2019). Similarly, our paper finds that CEOs are willing to trade off shareholder value in exchange for private benefits. In contrast to the M&A setting, a once-in-lifetime event for a target firm where the set of bidders is unobservable, we offer side-by-side comparisons of CEO investments in thousands of homogenous projects and provide evidence on their ex-post performance. Our evidence suggests that CEOs' private incentives affect the selection and implementation of investment projects even when such projects are repeated, transparent, and standardized.

Finally, we add to a body of work that uses the oil and gas industry as a laboratory to address fundamental questions in corporate finance. Prior papers have used a similar industry setting to study the sensitivity of investment to cash flow (Lamont 1997), pay-for-luck among CEOs (Bertrand and Mullainathan 2001), risk-shifting (Gilje 2016), hedging and firm value (Gilje and Taillard 2017), debt overhang (Wittry 2020), and idiosyncratic risk in capital budgeting (Décaire 2021). We extend this work by studying how CEOs' private benefits affect their project choice and investment performance.

1. Empirical Setting

1.1. The Oil and Gas Industry

The oil and gas (O&G) industry represents an important sector in the economy. The dotted line in Figure 1 plots the annual capital expenditures in the O&G industry as a fraction of total capital expenditures in the U.S. economy in 2000–2020, using the U.S. census data on national capital investment. During the mean (median) year in this period, the industry contributes 9.2% (11.1%) of nationwide capital investment and consistently ranks among the top investment drivers in the economy. The solid line in Figure 1 shows that the energy sector also accounts for a significant share of the U.S. stock market capitalization. During the median (mean) year in 2000–2020, the energy sector constitutes 8.4% (12.0%) of the S&P 500 index. Besides the financial metrics, the O&G industry supports 10.3 million jobs. These contributions suggest that investment decisions in the O&G sector have a significant impact on the economy in supporting economic growth, regional development, and job creation.

Several institutional features make the O&G sector well-suited for studying CEOs' investment decisions. First, this is a capital-intensive industry where investment decisions play a first-order role in value creation. Second, investment decisions in this sector are highly centralized, and the CEO holds the main decision authority in establishing each firm's investment strategy (Graham, Harvey, and Puri 2015). Third, investment projects are standardized. The typical investment project in the industry involves drilling a series of wells, and the project's location, investment, and cash flows are observable and easy to compare. Drilling projects account for the dominant majority (83.5%) of total capital investment in the industry, with the remaining 16.5% spent on the acquisition of land and infrastructure (Gilje and Taillard 2016).

Investment sites in oil and gas fields are located in 19 states across the country, extending from the East Coast to the West and scattered across many large and economically important states, such as Texas, Ohio, Pennsylvania, and New York.[1] In 2020, the states with oil and gas investment projects in our sample account for 33.6% of the U.S. population and 33.2% of the GDP. Figure 2 plots the locations of new oil

[1] The 19 states with oil and gas exploration in our sample include Alaska, Kentucky, Louisiana, Mississippi, Montana, Nebraska, Nevada, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas, Utah, West Virginia, and Wyoming.

and gas wells drilled in the United States from 2000 to 2020. To illustrate temporal dynamics, light-shaded and dark-shaded dots indicate wells drilled earlier and later in the 2000–2020 sample period, respectively.

In summary, the O&G industry accounts for one tenth of capital investment in the U.S. The investment decisions are centralized in the firm's executive suite, and the projects are well-defined, homogenous, and economically important. Thus, the O&G sector offers a convenient setting for studying CEOs' investment decisions and plays a significant role in regional and national economic development.

1.2. Project Lifecycle, Cash Flows, and Technology

The lifecycle of a typical investment project in the O&G sector consists of two stages: (1) exploration and (2) development. At the exploration stage, a firm investigates the geological potential of an oil and gas field. After confirming the field's resources, the firm classifies it as a proven reserve. At any point in time, a typical O&G firm has hundreds of proven reserves, and the firm's management plays a key role in determining which reserves to develop and in what sequence. The significant subjectivity inherent in this managerial decision offers a useful setting for studying the role of CEOs' private interests in the selection, implementation, and sequencing of investment projects.

The development stage of an investment project includes the preparation of the reserve for extraction, followed by drilling, extraction, and site cleanup. The pattern of cash flows for the typical project includes a large initial investment in site development, followed by positive cash inflows from resource extraction (greater in the first years of a project's life), and a small close-up investment at the end of a project's life aimed at the conservation of a depleted well. The typical oil and gas well remains in production for 20–25 years, and this period corresponds to the useful life of an investment project in our setting.

The output for each drilling investment project is a combination of oil and natural gas, as their deposits are often extracted simultaneously in the drilling process. The widely available prices of these commodities facilitate the estimation of project cash flows.

The initial output of a well in the first year is highly informative about its future productivity. The production output in the first full year of extraction (i.e., the baseline production level) is typically the highest output level achievable during a project's lifetime. With each additional year, the well is gradually depleted, and the output level declines. Several models in petroleum engineering provide robust estimates of a well's future productivity and longevity based on its observed productivity in the initial year and other geological factors (e.g., Fetkovich et al. 1996; Li and Horne 2003). These forecasts of a project's future cash flows allow us to test how CEOs' capital investment decisions respond to the revelation of value-relevant information after the project's initiation, as well as evaluate the efficiency of such investment decisions ex ante and ex post. Appendix Figure A.1 depicts a representative pattern of a well's productivity over time according to the forecasting model of Fetkovich at al. (1996).

The technological scope and development costs of investment projects in the O&G industry are highly standardized. Virtually all investment projects during our sample period of 2000–2020 are executed via one of the two drilling technologies: (1) vertical drilling or (2) directional drilling.

Vertical drilling is the traditional drilling technology for accessing an underground reserve of fossil fuels located directly underneath the well site by drilling vertically into the ground. The vertical drilling method was the primary way of resource extraction until the development of the hydraulic fracturing in the early 2000s, which made possible directional drilling. Directional drilling involves drilling non-vertical wells, which access the ground at an angle other than 90 degrees. This technology permits extracting subsurface deposits that are inaccessible from directly above because of various obstacles, such as wetlands, buildings, or abnormal reservoir shapes. By the end of 2011, new directional wells surpassed new vertical wells in total drilling footage, and by 2013, directional wells accounted for the majority of all new oil and gas wells drilled in the United States.

In summary, given the large number of proven reserves available to the typical firm, the management holds significant flexibility in selecting and sequencing investment projects. Projects are well-standardized in their technology, cash flow pattern, and production output. A project's initial productivity is informative about its future cash flows due to the predictability of reservoir depletion patterns.

1.3. The Effect of Resource Extraction on Local Landowners

The development of an O&G reservoir increases the value of land encompassing the reservoir. The increase in land value is driven by the fact that a firm must acquire a permit to extract fossil fuels by entering into a contract with the owners of land and mineral rights (mostly private individuals). In exchange for the permit to drill, firms provide monetary compensation to the mineral right owners in the form of an upfront cash bonus and a royalty stream (15%–25% of the well's production output), which drive up the local land prices.

Appendix Table A.1 confirms that the development of an O&G reservoir, both on the extensive and intensive margins, leads to an increase in the cash compensation to the local owners of land and mineral rights. The dependent variables are the royalty rate (columns 1–4) and cash bonus (columns 5–8) paid by oil and gas firms to landowners for drilling rights in 2000–2020. The data on cash and royalty payments are from DrillingInfo. The first independent variable of interest is the binary indicator *Drilling activity*, which is equal to 1 after the first well is drilled in a township and 0 otherwise. The second independent variable of interest is *Township drilling intensity*, the natural logarithm of the number of wells drilled in a township. These two variables capture the extensive and intensive margins of the local drilling activity.

The results in Appendix Table A.1 show that both the commencement of drilling and the intensification of drilling increase cash transfers to landowners in the township adjacent to the drilling site. These results are reliably significant, with most *t*-statistics greater than 3, and they hold after controlling for unobservable township heterogeneity and time trends via township and year fixed effects, respectively.

The conclusion that the commencement of drilling and the intensification of drilling produce large increases in the cash transfers to local landowners is consistent with prior research. The positive wealth shocks from the drilling activity to the landowners are sufficiently large to drive up local bank deposits by 39% (Plosser 2014) and to induce the local landowners to quit their regular jobs (Bellon, Cookson, Gilje, and Heimer 2021). Consistent with the economic importance of these private benefits effects, Fedaseyeu, Gilje, and Strahan (2019) conclude that "Landowners in shale-boom areas receive big inflows of wealth, tantamount to thousands of local residents 'winning the lottery'" (p. 6).

In summary, the commencement of drilling investment projects and the addition of new projects in the area produce large positive shocks for the landowners in the townships adjacent to the drilling sites. These effects provide private incentives for the local landowners to induce firms' drilling activity.

2. Data and Sample

2.1. Firms and Investment Projects

We begin our sample construction with identifying public and private firms engaged in oil and gas exploration in the United States in 2000–2020. To identify such firms, we obtain the universe of U.S.-based oil and gas drilling projects from DrillingInfo. This is the most comprehensive project-level data repository for the oil and gas industry, and it is widely used by the U.S. federal agencies, such as the Environmental Protection Agency (EPA) and the U.S. Energy Information Administration (EIA) of the U.S. Department of Energy. These data serve as the foundation for government reports on Petroleum Supply Monthly (PSM) by the EIA and the Inventory of U.S. Greenhouse Gas Emissions and Sinks by the EPA. The dataset includes over 30 project-level characteristics for each oil and gas well, including its location coordinates, rock formation features, exploration technology (vertical vs. directional drilling), the drilling firm, the date of drilling and closure, drilling depth, monthly production volume, and royalty payments to the landowner.

We augment these project-level data with two additional datasets. First, we collect per-project capital expenditures, including per-foot drilling costs, from regulatory pooling documents. Second, we obtain prices of oil and natural gas from the EIA.

We restrict the sample to firms that have available data on the identity of their CEO. From this initial set of 318 firms, we exclude 20 foreign firms because their CEOs reside outside the United States. We also exclude project-level observations with missing data. After imposing this filter, we arrive at our main sample of 298 firms, 412 CEOs, and 229,001 investment projects. Appendix Table A.2 shows the sequence of sample selection criteria and the number of observations retained after each filter.

Panel A in Table 1 reports summary statistics for our sample firms. Among the 298 sample firms, 170 are publicly traded, and 128 are privately held. The average (median) firm invests about \$243 (\$78) million per year in drilling projects, operates 592 (158) wells, and initiates 72 (23) new investment projects per year. The additional breakdown of these statistics between public and private firms shows that public firms have a greater number of active wells, initiate more drilling projects per year, and operate in more states. The average (median) public firm owns assets with a book value of \$16.2 (\$3.2) billion, has an annual investment rate of 28% (24%) of book assets, maintains a market-to-book ratio of 1.98 (1.57), and generates an annual return on assets of 12% (14%).

Panel B in Table 1 reports summary statistics for investment projects. The 229,001 investment projects in our sample account for a combined capital expenditure of $938 billion (expressed in year 2020 dollars). The average (median) drilling project is located 766 (557) kilometers from the headquarters, requires an investment of $3.4 ($3.7) million, and generates an annual cash inflow of $3.2 ($1.4) million in the first year of production. The median project generates an internal rate of return (IRR) of 14.1% per year. This pattern is consistent with high commodity prices during our sample period. The average (median) price of oil is $71 ($73) per barrel, and the average (median) price of natural gas is $4.96 ($4.24) per 1,000 of cubic feet, well above the average extraction costs for these resources. As mentioned earlier, the drilling projects are spread out across 19 states, and the average (median) state has 12,053 (2,476) active wells.

2.2. CEOs and Their Families

For public firms, we collect CEO information from regulatory filings with the Securities and Exchange Commission (SEC), such as definitive proxy statements, quarterly and annual reports, and press releases. For private firms, we obtain CEO data from Capital IQ (People Intelligence) and BoardEx. We supplement these sources with information from executive biographies and historical archives of corporate websites retrieved via Wayback Machine. Throughout this process, we obtain the CEO's full name, year of birth, and the starting and ending dates of his or her tenure.

Using the combination of the CEO's full name and birth year, we manually identify the executive in the Lexis Nexis Public Records database (LNPR), which aggregates information on over 500 million U.S. individuals (live and deceased) from federal, state, and county records. Such records include deed and assessment records, birth records, voter registrations, utility records, and criminal filings. Individuals are traced via a unique ID, linked to one's social security number and employment. Prior research has used LNPR to obtain personal data on CEOs (Cronqvist, Makhija, and Yonker 2012; Yermack 2014; Duchin and Sosyura 2021), directors (Alam, Chen, Ciccotello, and Ryan 2014), fund managers (Pool, Stoffman, and Yonker 2012; Chuprinin and Sosyura 2018), and securitization agents (Cheng, Raina, and Xiong 2014).

We manually validate the accuracy of each match to LNPR by ensuring that the CEO's employer, work email address, and occupation listed in the employment records in LNPR match the executive's career history. We also perform an external validity check of our matches. For a subset of CEOs with political contributions reported to the Federal Election Commission (FEC), we compare the CEO's home address listed in LNPR with his address, occupation, and employer listed in the FEC records. This step provides an external validation of our matches because the data on CEOs' addresses and employment in LNPR and FEC come from unconnected sources (county and employment records in LNPR and political contribution forms in FEC). We are able to establish reliable matches to LNPR for all domestic CEOs in our sample.

Using LNPR, we obtain each CEO's date of birth (month and year), state of origin (indicated by the first three digits of his social security number), and the list of immediate relatives (identified by LNPR via state vital records). Panel C in Table 1 reports summary statistics for the 412 CEOs in our sample, of whom 236 lead public firms, and 176 run private firms. 408 CEOs (or 99% of the sample) are male, consistent with a higher prevalence of male CEOs in the energy sector. The average (median) CEO in our sample is 56 years old and has a firm tenure of 9.3 (8.0) years. The average CEO is connected to 10 relatives in LNPR (siblings, parents, adult children, spouses, and in-laws) who reside in four different states.

We also obtain CEOs' education and board memberships from BoardEx and hand-collect data on CEOs' undergraduate majors from the archives of college yearbooks and executive biographies. The most common undergraduate majors for the CEOs in our sample are engineering (65%) and business (16%). Approximately one third of the CEOs (34.6%) hold graduate degrees, and the most common graduate degree is an MBA (18.5%). About 55% CEOs serve as the chair of the board of directors at their firm, and the average (median) CEO holds 2.1 (2) external board seats.

2.3. CEOs' Investment Properties

LNPR covers the universe of county deed records during our sample period, allowing us to reconstruct the history of each CEO's ownership of real estate assets. For each CEO, we retrieve the history of real estate transactions from the CEO's comprehensive person report in LNPR. We also identify the properties that CEOs own via family investment trusts, since these transactions are more common among the wealthy. When a CEO is a beneficiary of a trust, this business is linked to his comprehensive report in LNPR, and the deed record for the property usually lists the trust beneficiaries' names in a separate field.

For each real estate asset of interest, we obtain its LNPR property report, which aggregates information from deed, assessment, and mortgage records. While the level of detail varies by county, these sources typically include property details (e.g., land acreage, improvement value, and the breakdown of assessed value between land and structures), transaction details (e.g., purchase and sale dates and transaction prices), and ownership details (e.g., co-owners, liens, and parcel numbers). For some properties, we also observe financing information from mortgage records, such as the amount of the loan, the history of refinancing, and the lending institution.

To focus on investment properties, we exclude the CEO's primary residence because it is usually acquired for consumption rather than investment purposes. We also exclude properties for which the value of land accounts for less than 50% of the total assessment value.[2] Those properties are more likely to be acquired for the value of their buildings (e.g., rental homes) rather than for land speculation. We define the CEO's primary residence as the address where the CEO is registered to vote, according to the history of voter registration records in LNPR. This is nearly always the address where the CEO lives together with his spouse (according to utility connection records) and the home address listed on the CEO's political contribution forms (for the subset of CEOs who make political contributions).

Using the address of each property and its GPS coordinates, we focus on CEOs' investment properties located within 20 kilometers (12 miles) of any proven oil and gas field in the U.S. Our results are not sensitive to this threshold and hold under narrower definitions, including the distance of 10 kilometers (6.2 miles) from an oil field. We choose the radius of 20 kilometers as our main specification because the shape of an oil and gas field typically grows as the field is being developed, and new reserves are discovered. Figure 3 illustrates this geospatial expansion by plotting the development of the Sandhill Field in Texas from 2000 to 2020 and showing how a typical oil field extends its boundaries over time.

Panel D in Table 1 shows that the CEOs in our sample own 155 investment properties near oil and gas fields. These investment properties come in the form of predominantly vacant land, and they are located in the immediate proximity to oil fields. For example, for the median investment property, land accounts for 97% of the property's assessment value, and the distance between the property and the nearest oil and gas well is 5.3 kilometers (3.3 miles). This pattern is consistent with the idea that these investments stand to benefit the most from the oil field's exploration and the resulting increase in the prices of land and mineral

2 We test the sensitivity of our results to this threshold by restricting to the sample to properties for which the ratio of market land value to total value is no less than 99% and obtain similar results.

rights in the area. Figure 4 shows a sample CEO's land lot and plots the drilling activity in its vicinity. The CEO's property in the figure spans 95.7 acres.

The CEOs' real estate assets adjacent to oil fields are economically important. The mean (median) value of an investment property is $1,010,000 ($250,000), and the majority of the 92 CEOs with such investments own multiple investment assets near an oil field. The average CEO with such investments owns 1.7 properties near an oil and gas field.

The average CEO investment property was acquired in 2004, and 45% of properties were acquired before the 2003 technological breakthroughs that combined hydraulic fracturing with horizontal drilling (Yergin 2011). Thus, a large fraction of CEOs' investment properties were acquired before their fossil deposits were discovered or became commercially viable. Furthermore, 53% of CEOs with such investments acquired their investment properties before their appointments.

In summary, the majority of CEOs already own their personal properties by the time they assume control over the firm's investment policy. Thus, their personal assets predate their professional decisions.

3. CEOs' Personal Assets and the Likelihood of Firm Investment

3.1. Propensity to Initiate Exploration and Production

We begin our analysis by studying how a firm's likelihood to enter an oil and gas field is related to the location of the CEO's private land assets. An oil and gas field (or reservoir) is a subsurface pool of hydrocarbons captured in porous formations of rock. We focus on oil and gas fields as a unit of geospatial variation to most closely match the capital budgeting process of oil and gas firms. In the financial disclosures pertaining to capital investment decisions, oil and gas firms typically discuss their investment plans and projections in terms of oil and gas fields, rather than counties, cities, or any other geopolitical units.[3] This unit of geospatial variation also follows the natural, irregular shapes of fossil fuel formations, which define the boundaries for drilling activity in a given location. An oil and gas field is a highly granular unit of analysis, with the mean radius of 53.6 km or 33.3 miles. Our sample contains 1,530 fields.

[3] For example, in the discussion of capital budgeting, Exxon Mobil notes "The corporate plan is a fundamental annual management process that is the basis for setting operating and capital objectives in addition to providing the economic assumptions used for investment evaluation purposes. Volume projections are based on individual field production profiles, which are also updated at least annually." Exxon Mobil Annual report for the fiscal year 2020, page 40.

Table 2 examines a firm's propensity to initiate exploration and production in a field with documented fossil fuel deposits. The regression is estimated as a linear probability model, where the dependent variable is a binary indicator that equals one if the firm enters an oil and gas field during a given year, and zero otherwise. The opportunity set includes all fields with commercially viable deposits in a given year—namely, those that have at least one active oil and gas exploration site in that year. This approach accommodates the dynamic expansion of a firm's investment opportunity set across time as new oil and gas deposits are discovered or made commercially viable through technological innovation. The unit of observation is a firm-field-year.

The main independent variable is *CEO's Personal Investment*, a binary indicator that equals one if, as of the beginning of a given calendar year, the firm's CEO owns a personal investment property adjacent to the oil and gas field of interest. As discussed, a land investment property is defined as a personal investment, other than the CEO's primary residence, where the value of vacant land accounts for at least 50% of the total property value based on the tax assessment records. Other independent variables include the firm's realized investment budget for the respective year (*Investment level*) and the characteristics of the oil and gas field of interest, such as its proximity to the headquarters, oil-to-gas ratio, and existing drilling activity, which are relevant for the investment decision. Here and henceforth, standard errors are adjusted for heteroskedasticity and clustered by firm to accommodate time-series dependence in residuals.

Column 1 shows that a CEO is significantly more likely to initiate his firm's entry into an oil and gas field in the vicinity of his personal investments (within a 20-km radius of an oil and gas field), as shown by the positive and statistically significant coefficient on the term *CEO's Personal Investment*, with a *t*-statistic of 2.47. The coefficients on control variables show expected outcomes. Firms are more likely to enter a given field when they have more investment funds, when the field is closer to the headquarters, and when the field has more drilling activity, as proxied by the number of active wells.

Columns 2–6 sequentially enrich the specification with firm, year, CEO, and field fixed effects, respectively. In column 2, firm fixed effects absorb firm-level investment drivers that remain invariant during our sample period, such as the firm's location, industry composition, and business complexity. In column 3, year fixed effects account for the time-series variation in corporate investment across business cycles and control for the investment response of the oil and gas sector to new technological developments.

In column 4, CEO fixed effects capture time-invariant differences across CEOs, such as their innate ability, investment style (aggressive vs. conservative), and execution skills. In column 5, field fixed effects capture time-persistent regional factors that may affect business entry, such as location, rock formation, climate, accessibility, infrastructure, and ease of regulation. In column 6, we include all four groups of fixed effects simultaneously, saturating the regression model with firm, year, CEO, and field fixed effects. The results show that our conclusions are robust to absorbing various sources of heterogeneity, both individually (columns 2–5) and collectively (column 6). Across all these specifications, the coefficient on the indicator *CEO's Personal Investment* is positive, statistically significant at conventional levels (*t*-statistics of 2.29 to 2.49), and stable in economic magnitude (point estimates of 0.03 to 0.04).

Column 7 augments the specification by replacing firm and year fixed effects with firm∗year fixed effects, while also including CEO and state fixed effects. The inclusion of firm∗year fixed effects accounts for the dynamic determinants of a firm's investment in a given year, such as changes in the firm's financial condition, availability of investment funds, and investment opportunities. Our results remain similar in significance and economic magnitude in this specification.

Column 8 introduces the most restrictive specification with firm∗year, field∗year, and CEO∗state fixed effects. The addition of field∗year fixed effects accounts for field-level changes in the investment opportunities every year, such as changes in taxation, costs of extraction, business incentives, and discoveries of fossil fuels. The addition of these fixed effects absorbs dynamic control variables at the firm and field level.

Finally, CEO∗state fixed effects add a flexible system of controls for an array of unobservable connections that may exist between the firm's CEO and any given state. Specifically, the inclusion of CEO-state permutations in column 8 accounts for any time-invariant special relationships between the CEO and a given state, such as the CEO's local bias or home bias. For example, prior work shows that firms are more likely to hire CEOs from the same state (Yonker 2017a), less likely to divest establishments in the CEO's home state (Yonker 2017b), and more likely to acquire targets in the CEO's home state (Chung, Green, and Schmidt 2018 and Jiang, Qian, and Yonker 2019). Moreover, since the CEO resides in the state of the headquarters, the inclusion of CEO∗state fixed effects also accounts for any incremental propensity of firms to invest more in the state of headquarters, over and above the controls for distance to the oil field.

The results in column 8 show that a firm is more likely to enter an oil field where its CEO holds private assets, and that this conclusion is robust to absorbing high-dimensional sources of heterogeneity. The coefficient on the indicator *CEO's Personal Investment* remains positive, statistically significant (*t*-statistic = 2.21), and economically important. The point estimate of 0.034 in this most restrictive model (rounded to 0.03 in the table output) suggests that a firm is 3.4 percentage points more likely to initiate an exploration project in an oil field where its CEOs has a personal investment. A comparison of this marginal effect with the unconditional likelihood of entry into a given field (1.8%) suggests that the same firm is nearly three times more likely to initiate an investment in an oil and gas field in the vicinity of the CEO's private property than in an economically comparable field in the same year.[4] Thus, the CEO's private incentives are a first-order factor in the firm's investment policy.

In summary, a firm is significantly more likely to invest in the field where its CEO holds private investment assets. This conclusion is robust to controlling for the firm's dynamic investment opportunities and changes in the attractiveness of particular fields.

3.2. Robustness

This subsection investigates the robustness of our conclusions to imposing additional filters on CEOs' investment properties. These tests seek to establish a clean temporal sequence in the CEOs' personal and professional investment decisions and address alternative explanations.

Panel A in Table 3 restricts the sample of CEO properties to those that were purchased before the CEO assumed control over the firm's investment policy. This test aims to provide a clean temporal sequence, where the purchase of the property predates the CEO's professional appointment. Thus, this test mutes the possibility of reverse causality, a scenario under which the firm's entry into a given oil and gas field could drive the CEO's private personal investment, rather than the other way around. The main results persist strongly in this specification. The coefficients on the indicator *CEO's Personal Investment* are

[4] Relative to the unconditional probability of entry of 1.8 percent, the incremental increase of 3.4 percentage points raises the probability of entry to 5.2 percent, which represents an increase of 2.89 times (5.2/1.8 = 2.89).

positive, statistically significant at 5%, and comparable in economic magnitude to those obtained in the baseline specification in Table 2.

Panel B in Table 3 restricts the sample of CEO properties to those acquired before the discovery of oil and gas deposits in a given field. This test shuts down the possibility that the CEO purchased private land properties in anticipation of a firm's entry into a given oil and gas field. Our conclusions remain robust in this specification despite a significant reduction in the statistical power (and a slight decline in *t*-statistics) due to the focus on the subset of fields where oil and gas deposits were only recently discovered.

Appendix Table A.3 investigates the robustness of our results to a more restrictive definition of the CEOs' land investment properties. In this specification, we focus on investment properties that include only vacant land (i.e., the land accounts for over 99% of the asset value) and are located within 10 kilometers (6.2 miles) of an oil and gas formation. These properties stand to benefit the most when a firm initiates the exploration of an oil and gas field. Consistent with stronger private incentives from such properties, our results are sharper in this specification and have greater point estimates than those in Table 2.

Next, we test the robustness of our results to an alternative estimation method. Appendix Table A.4 uses the Cox proportional hazard rate model (Cox 1972) to estimate the relation between the location of the CEO's personal investment assets and the firm's decision to initiate exploration in their vicinity. This specification evaluates the expected amount of time (the hazard rate) that it takes for a firm to enter into a given region. The estimation confirms the results of our main analysis and yields an additional insight: firms are quicker to enter the fields where their CEO holds private investment assets. This conclusion is reliably statistically significant, with a *t*-statistic of 4.67.

Next, following the classical theories of CEO pet projects (e.g., Jensen and Meckling 1976; Jensen 1986), we study how the relation between the CEO's private assets and firm investment varies with the firm's free cash flow. As a source of plausibly exogenous variation in a firm's free cash flow, we exploit fluctuations in the market prices of oil and gas, under the assumption that such fluctuations contain an idiosyncratic component outside of the firm's control (e.g., tensions in the Middle East). Appendix Table A.5 shows that the empirical link between the CEO's private assets and firm investment is significantly stronger during periods of above-median oil prices, associated with more managerial slack.

Finally, we study how CEOs' investment properties are related to firms' exit from oil and gas fields. In Table A.6, we estimate a linear probability model of firm exit and find that firms are less likely to exit from oil fields encompassing their CEOs' investment properties. According to the full specification in column 6, a firm is 11 percentage points less likely to exit an oil and gas field where its CEO owns private investment assets, an effect significant at 1%, with the absolute value of a *t*-statistic of 2.71.

In summary, the association between CEOs' private assets and corporate investment persists for the CEOs' assets acquired before the discovery of fossil fuel deposits, suggesting that CEOs' assets likely affect subsequent firm investment, rather than vice versa. The relation with firm investment is stronger for land-only properties closest to oil and gas fields, where the CEO stands to benefit the most from the field's exploration. This relation is also stronger during periods of high oil prices and greater free cash flow. Firms are less likely to exit from oil and gas fields encompassing their CEOs' investment assets.

3.3. Instrumental Variable Analysis

This subsection aims to further tighten up the link between a CEO's ownership of personal assets in a given oil field and the firm's entry to commence oil extraction. To do so, we exploit an idiosyncratic driver of the CEO's personal ownership of assets in a given region, which is plausibly unrelated to the firm's investment opportunity set, except through the decisions of and benefits to the CEO. We argue that such an idiosyncratic component in the CEO's personal investment decisions arises from the CEO's familial connections.

We posit that a CEO is more likely to acquire private assets in oil fields located close to his relatives (their address history is from LNPR). First, the presence of a relative in the area increases the probability that a property will enter the CEO's consideration set. Second, a relative's proximity will likely reduce transaction costs associated with the property's acquisition and maintenance, while also increasing intangible benefits to the CEO. For example, suppose the CEO of an Oklahoma-headquartered firm has an adult son who lives in Dallas, Texas. We argue that such a CEO will be more likely to acquire an investment property in the vicinity of Dallas than an identical property in the same state (say, near Houston or San Antonio) because the one in Dallas is more likely to be considered during the CEO's personal travels to the Dallas area, and because it will be easier to purchase and maintain, with his son living nearby. Moreover, the CEO may derive extra benefits from property-related travels to Dallas, such as the opportunities to see his son and grandchildren. Yet, such idiosyncratic factors are plausibly unrelated to the firm's investment opportunities and entry, except through the CEO's private benefits (both pecuniary and intangible).

Panel A in Table 4 shows the first-stage regression explaining the CEO's decision to acquire an investment property in a given area. The first-stage regression is estimated as a linear probability model with the same groups of fixed effects and control variables as in our baseline specification in Table 2. The dependent variable is the binary indicator *CEO's Personal Investment*, defined as in the main analysis. The instrumental variable is the indicator *Family Connection*, which is equal to one if the CEO has a family member (a child, parent, sibling, or in-law) who lives within 20 kilometers of the investment property, and zero otherwise. We use a conservative definition for the distance between the relative and the property to ensure that the property can be reached within easy driving distance from the relative's home. Such a granular definition also minimizes the possibility of omitted variables.

Panel A shows that CEOs are more likely to acquire investment properties in close proximity to their relatives. This result is reliably significant at 1%, with the *t*-statistics of 3.28 to 3.52. Across all specifications, including those with high-dimensional fixed effects, the first-stage Kleibergen-Paap F-statistics exceed the standard threshold of 10 recommended for strong instruments in linear regressions (Stock and Yogo 2005).

Panel B in Table 4 shows the results of the second-stage instrumental variable regression, which examines the effect of a CEO's private assets on firm investment decisions. The dependent variable is the binary indicator *Enter*, equal to one if a firm initiates an investment in an oil and gas field, and zero otherwise. The main independent variable is the predicted value of the indicator *CEO's Personal Investment*. The result from the second-stage regression confirms the strong positive effect of a CEO's private investment on the firm's entry into an oil and gas field. The coefficients on the instrumented indicator *CEO's Personal Investment* are positive and statistically significant across all specifications.

In summary, the presence of relatives within driving distance from a property is a strong predictor of the CEO's ownership of investment land. Using this source of variation as an instrument for the CEO's personal investments, we find that the effect of the CEO's private assets on firm investment is likely causal.

4. The Intensity of Firm Investment

The motivating evidence at the start of our analyses indicates that a higher intensity of oil and gas exploration increases monetary benefits accruing to the local landowners. This section tests the effect of such monetary incentives on CEOs' capital budgeting decisions, focusing on the intensity and efficiency of corporate capital investment in oil and gas fields encompassing the CEOs' private assets.

Table 5 studies whether firms increase the intensity of drilling and exploration in the oil and gas fields where their CEOs own private investment assets. The dependent variable is the firm's annual investment rate in a given oil and gas field (expressed in percent), where the investment rate is measured as the ratio of new wells driven in the field of interest to the total number of new wells drilled by the firm in a given year. The main variable of interest is the indicator *CEO's Personal Investment*. All regressions include controls for the characteristics of the field that capture its extraction costs and productivity such as the oil-to-gas ratio, distance to the headquarters, total wells drilled by all firms, and production output (in dollars based on the annual extraction volume and the prevailing commodity prices). As in prior analyses, columns 2–5 sequentially enrich the specification with firm, year, CEO, and field fixed effects, respectively, and column 6 includes all of said groups of fixed effects simultaneously. Columns 7–8 saturate the models with high-dimensional fixed effects for firm∗year, field∗year, and CEO∗state.

The results in Table 5 yield two conclusions. First, firms conduct more drilling in the oil fields where their CEO owns private land, as indicated by the positive and statistically significant coefficient on the indicator *CEO's Personal Investment*. This result holds robustly (with a *t*-statistic of 2.21) even in the most restrictive specification in column 8, saturated with firm∗year, field∗year, and CEO∗state fixed effects. Such a specification accounts for the dynamic drivers of investment at the firm-year level (such as the firm's annual budget, financial condition, and investment opportunities) and field-year level (such as changes in its investment attractiveness, extraction costs, productivity, or local regulation). The inclusion of CEO∗state fixed effects absorbs the effect of time-persistent CEO characteristics, such as innate ability and investment style, as well as the effect of persistent connections between the CEO and a given state, such as the CEO's state of origin, state of education, and state of residence (firm's headquarters). According to the point estimate in the most restrictive specification in column 8, a firm invests 6.82 percentage points more into oil field where its CEO owns private investment land.

Second, Table 5 shows that corporate investment becomes less responsive to investment opportunities when firms invest in the oil fields encompassing their CEO's private assets. This result is captured by the coefficients on the interaction term *CEO's Personal Investment* ∗ *Field Average Production Value*. The coefficients on this term are uniformly negative and statistically significant at 5% or 10% in all specifications. To the extent that a well's annual output captures the marginal product of investment capital, this result suggests that corporate investment in CEO pet projects is less sensitive to the measures of the project's output. A muted responsiveness of capital investment to its marginal product is generally interpreted as evidence of lower investment efficiency (e.g., Shin and Stulz 1998; Ozbas and Scharfstein 2010), a result consistent with the predictions of the classical theories of CEO pet projects (e.g., Jensen and Meckling 1976; Rajan, Servaes, and Zingales 2000).

In summary, CEOs commit more corporate investment resources to the oil and gas fields where they hold private investment properties. Such investments appear to dampen investment efficiency and weaken the responsiveness of capital to its marginal product.

5. Investment Outcomes

The analysis in this section seeks to distinguish between two possible interpretations of the firms' propensity to invest in the oil fields adjacent to the CEO's personal land assets. On the one hand, such investments could take advantage of the CEO's private information and improve investment outcomes. On the other hand, such investments could prioritize the CEO's private benefits over those of the shareholders and lead to suboptimal capital allocations. To test these predictions, we study the performance of CEO pet projects (section 5.1) and examine how it varies with the balance of power between the CEO and the shareholders (section 5.2).

5.1. Project Performance

Table 6 studies the performance of corporate investments in the oil fields adjacent to CEO properties. The unit of observation is a drilling investment project, defined at the well level. The dependent variable is the project's production output in the first full year of operation, measured in millions of dollars. As discussed earlier and detailed in Appendix 1, a well's output in the first full year of operation is the highest level of production during its useful life. This initial output is highly informative about the well's quality because of the strong predictability in depletion patterns of fossil fuel deposits. By focusing on the output in the first year, we obtain a useful and timely measure of each project's revealed quality without the need to restrict the analysis to only late-stage projects (20–25 years old) where all of the cash flows have been realized.

The high granularity of project-level data allows us to selectively absorb the sources of heterogeneity in project performance across CEOs, firms, years, townships, and project technologies, as well as compare between the projects of the same firm in the same year (firm*year fixed effects) and between the projects in the same township and in the same year (township*year fixed effects). For example, the comparisons at the township level effectively juxtapose the performance of CEO pet projects to other investment projects within the same 100 square km (36 square mile) land lot. As discussed, the average distance between a CEO's private assets and the nearest well is 5.3 kilometers (3.3 miles).

The results in Table 6 show that investments in wells adjacent to CEOs' private assets have lower performance. The coefficients on the variable *CEO's Personal Investment* are uniformly negative and statistically significant at conventional levels across all columns (*t*-statistics of 1.94–3.62). According to the point estimate in the most restrictive specification in column 8 (coefficient = -0.38), wells adjacent to the CEOs' private investment properties, on average, yield $380,000 less in the first year of production. Relative to the unconditional value of the first-year production ($3.22 million), this marginal effect represents an 11.8% decline in productivity. Since these estimates are derived in a specification township*year and firm*year fixed effects, they suggest that the wells with private benefits to the CEO deliver lower output for the firm, relative to other wells drilled by the same firm in the same year, and those drilled in the same township in the same year.

One interpretation of this evidence is that the location of the CEO's private assets adds an idiosyncratic constraint on the firm's drilling activity, and, as a result, such a constrained choice is associated with lower project quality. Also, the higher intensity of the firm's drilling near its CEO's investment properties could lead to the stepping down in well quality, relative to the most productive wells that could be drilled in the same township but away from the CEO's assets.

Table 7 examines the performance of CEO pet projects by exploiting only the subset of CEO investment properties acquired through inheritance. We consider a property inherited if it was previously owned or occupied by one of the CEO's senior relatives (e.g., parents, siblings, or in-laws), according to the records in LNPR. By focusing on such endowed properties, this analysis mostly shuts down the selection mechanism in property acquisitions.

Table 7 shows that the underperformance of drilling projects adjacent to CEOs' private properties persists and becomes more pronounced if we focus on endowed investment assets. The coefficients on the term *CEO's Personal Investment* are negative, statistically significant at 1%, and larger in economic magnitude relative to the unconditional sample of CEOs' private assets. The increase in the performance gap of such investment projects is consistent with the view that a focus on inherited properties mutes the positive impact of the CEO's private information, while retaining the agency incentives for private benefits.

Table 8 evaluates project outcomes according to the internal rate of return (IRR) and the net present value (NPV)—the two most common project evaluation criteria applied by corporate executives in capital budgeting decisions (Graham and Harvey 2001). Appendix A provides details on the estimation of capital budgeting criteria at the project level.

Columns 1–4 show that CEO pet projects deliver lower IRRs. According to the full specification in column 4, the IRR of wells adjacent to CEOs' investment properties is 9 percentage points lower than the IRR of other wells drilled by the same firm in the same year and located in the same geographic area. The performance differential is mainly attributable to the difference in cash inflows (e.g., a higher likelihood of dry holes and a lower likelihood of blockbuster wells) rather than cash outflows. In unreported tests that separately examine cash inflows and outflows, we find that the drilling costs of wells adjacent to CEOs' properties are statistically indistinguishable from those of other wells drilled by the same firms. This is consistent with prior evidence on cash flow patterns in the oil and gas industry (Gilje and Taillard 2016).

Columns 5–8 show that CEO pet projects deliver lower estimated NPVs, consistent with the evidence from other project metrics. We alert the reader that the NPV estimates are inherently more subjective and require additional assumptions in the estimation of the discount rate. Thus, we view this evidence as confirmatory and suggestive. According to the full specification in column 8, the average drilling project in the vicinity of a CEO's property yields an NPV that is \$0.57 million less than that of a comparable project with the same technology drilled by the same firm in the same year. One explanation for this outcome is that the higher intensity of drilling around CEO properties (shown in Table 5) is associated with diminishing marginal returns, consistent with overinvestment.

In summary, investment projects with private benefits to CEOs deliver weaker performance for the firm. This result persists across several project outcomes and a variety of benchmark groups. This evidence suggests that CEOs' ownership of personal assets introduces additional constraints in capital budgeting decisions, and such a constrained outcome appears to underperform its unconstrained investment peers. Overall, CEO pet projects appear to be prioritized in the presence of superior investment alternatives.

5.2. The Role of Corporate Governance

This subsection studies how the association between CEO pet projects and investment outcomes varies with managerial control rights and the balance of power between the CEO and shareholders. If such investments reflect agency frictions, theory predicts that they will produce worse outcomes for the firm when the agency conflict between the CEO and the shareholders is more severe (e.g., Jensen and Meckling 1976). We examine three measures of governance: (1) CEO control rights, (2) shareholder ownership concentration, and (3) separation of ownership and control. We alert the reader that these governance dimensions are endogenous, and our goal is to test their associations with pet project outcomes without implying causality.

Panel A in Table 9 focuses on CEOs' control rights. As a source of variation in the CEO's control and monitoring intensity, we exploit the CEO's position on the firm's board. About 55% of our sample firms combine the position of CEO with the post of the chairman of the board. CEOs who simultaneously serve as the chairman of the firm's board typically possess greater control rights over the firm's investment policy and face weaker monitoring from the board. To test whether these factors matter for the outcomes of CEO pet projects, we introduce an indicator variable for the CEO's dual role as the chairman of the board and test its interaction effect with project outcomes, using the same specification as in Table 7.

The results in Panel A show that the underperformance of CEO pet projects is mitigated by the separation of power between the chairman and the CEO. This result is captured by the negative and statistically significant coefficients on the interaction term between *Separation of Chair and CEO* and *CEO's Personal Investment*. The economic magnitudes of the interaction term suggest that the vast majority of the performance differential for CEO pet projects is attributable to firms that combine the post of the chair and CEO. One interpretation of this evidence is that at firms with the separation of CEO and chairman duties, the CEO does not undertake the weakest pet projects that erode investment performance. This finding is consistent with the importance of a control mechanism on the CEO's decision rights emphasized in the classical frameworks of the CEO's private motives in investment decisions. For example, Fama and Jensen (1983) argue that agency costs are reduced by the separation of decision rights from decision control, and Jensen (1993) concludes that "for the board to be effective, it is important to separate the CEO and Chairman positions." (p. 36). Empirically, this evidence is also consistent with a strong recent trend towards the separation of CEO and chairman duties in an effort to curb self-serving managerial behaviors.

Panel B in Table 9 examines the relative power of the shareholders, measured by ownership concentration. This measure, computed as the Herfindahl index of the shares of institutional shareholders, is motivated by the evidence that the presence of blockholders (captured by the high value of the index) increases the shareholders' monitoring incentives and serves as a control mechanism against managerial self-dealing. Panel B shows that the underperformance of CEO pet projects is mitigated in the presence of a more concentrated ownership structure. This mitigating effect is captured by the positive and statistically significant interaction term between *Ownership Concentration* and *CEO's Personal Investment*.

Finally, Panel C in Table 9 examines the performance outcomes of CEO pet projects between public and private firms. The CEOs of private firms are often significant owners of their enterprises, a pattern that increases the alignment of their incentives with the value maximization of the firm. In contrast, the CEOs of public firms are professional managers, whose private incentives are more likely to deviate from those of the shareholders. The results in Panel C show that nearly all of the negative performance effects associated with the CEO pet projects are attributable to publicly traded firms, consistent with a higher likelihood of agency frictions in organizations with a starker separation of ownership and control.

In summary, the underperformance of pet projects is more pronounced when the CEO has stronger control rights (chairman of the board) and faces weaker monitoring (less concentrated shareholder ownership). Overall, such pet projects appear to arise from the tension between the CEO's private incentives against the system of checks and balances curbing managerial opportunism.

6. Conclusion

This paper has studied how CEOs' incentives from personal assets affect their professional investment decisions. We find that CEOs prioritize corporate investment projects with private benefits at the expense of shareholder value. Our findings suggest that CEOs' private interests introduce frictions in capital budgeting decisions and produce large economic consequences for the firm. Although CEOs' pet projects have played a central role in the agency theory, our paper is among the first to identify them in project data and analyze their effects on investment efficiency and net present value.

Our study makes a step towards understanding the role of CEOs' monetary motives outside of the firm. While most prior work has focused on CEOs' professional incentives, such as career concerns or compensation contracts aimed to align the incentives of principals and agents, our evidence suggests that the efficacy of these mechanisms could be outweighed by CEOs' private monetary gains. We hope that the growing interest in constructing a more complete picture of CEOs' personal assets and private incentives outside of the firm will continue to expand our understanding of their professional decisions.

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Figure 1

The Economic Importance of the Oil & Gas Sector

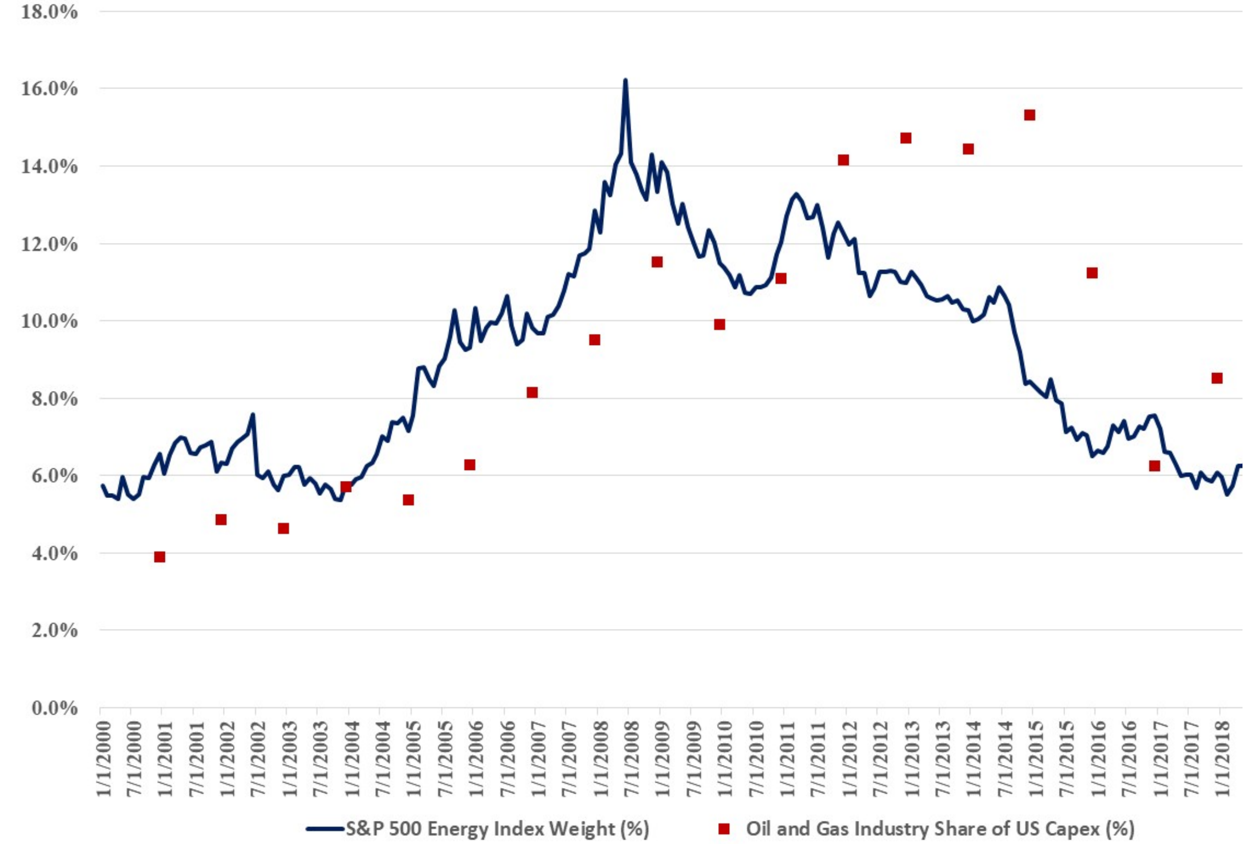


Figure 1: Weight of the Energy Industry Over Time

The figure the share of the energy industry in the S&P 500, and the share of energy industry from the total US capital expenditure over the period 2000-2020. Data for the share of the energy industry in the S&P 500 is from the Bloomberg terminal (Code S5ENRS Index). Data for the of energy industry share of the US total capital expenditure is from the 2001, 2012, and 2021 Capital Spending Report "Tables 2a. Total Capital Expenditures for Companies with Employees by Industry Sector." The census bureau does not direct report the total capital expenditure for the oil and gas industry, but instead provide data for the "mining" industry. To recover a direct estimate for the share of the energy industry, we use the breakdown of the mining industry provided in the Census report "Capital Expenditures for Structures and Equipment for Companies with Employees: 2018 and 2017 Revised", applying the 2018 weight to the full 2000 to 2019 period (i.e., 142.8 Billions/ 153.4 Billions). This breakdown is available at "https://www2.census.gov/programs-surveys/aces/visualizations/2017/mining.pdf".

FIGURE 2

Oil and Gas Regions in the United States in 2000-2020

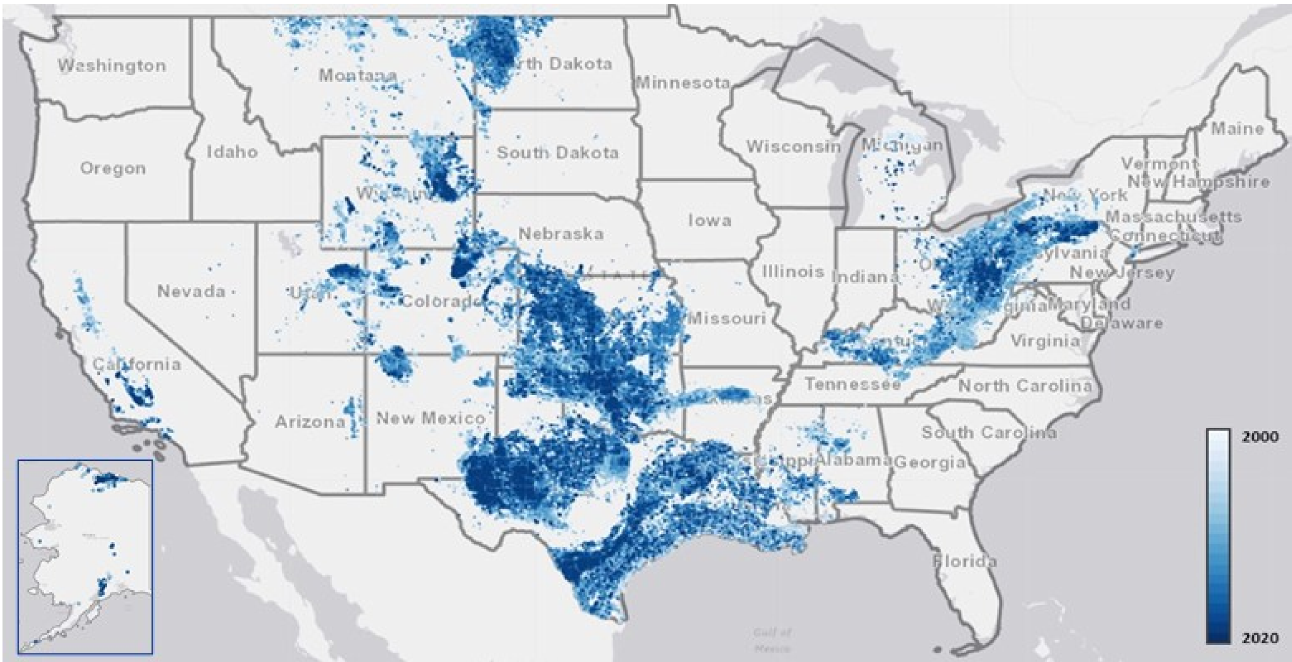


Figure 2: Oil and Gas Exploration and Production (Alaska in the lower left corner)

The figure plots the geographic location of the oil and gas wells drilled across the United States for the period 2000 to 2020, for which our dataset contains at least the spud date (i.e., the date the drilling for the well started). The wells are color coded in different shades of blue to indicate the year during which they were drilled. For example, a well color coded in light blue denotes a well drilled in the earlier part of the sample, while a well color coded in darker shade of blue denotes a well that was drilled in the later part of the sample. The source of the figure is: https://www.enverus.com/.

FIGURE 3

The Development of an Oil and Gas Field Over Time

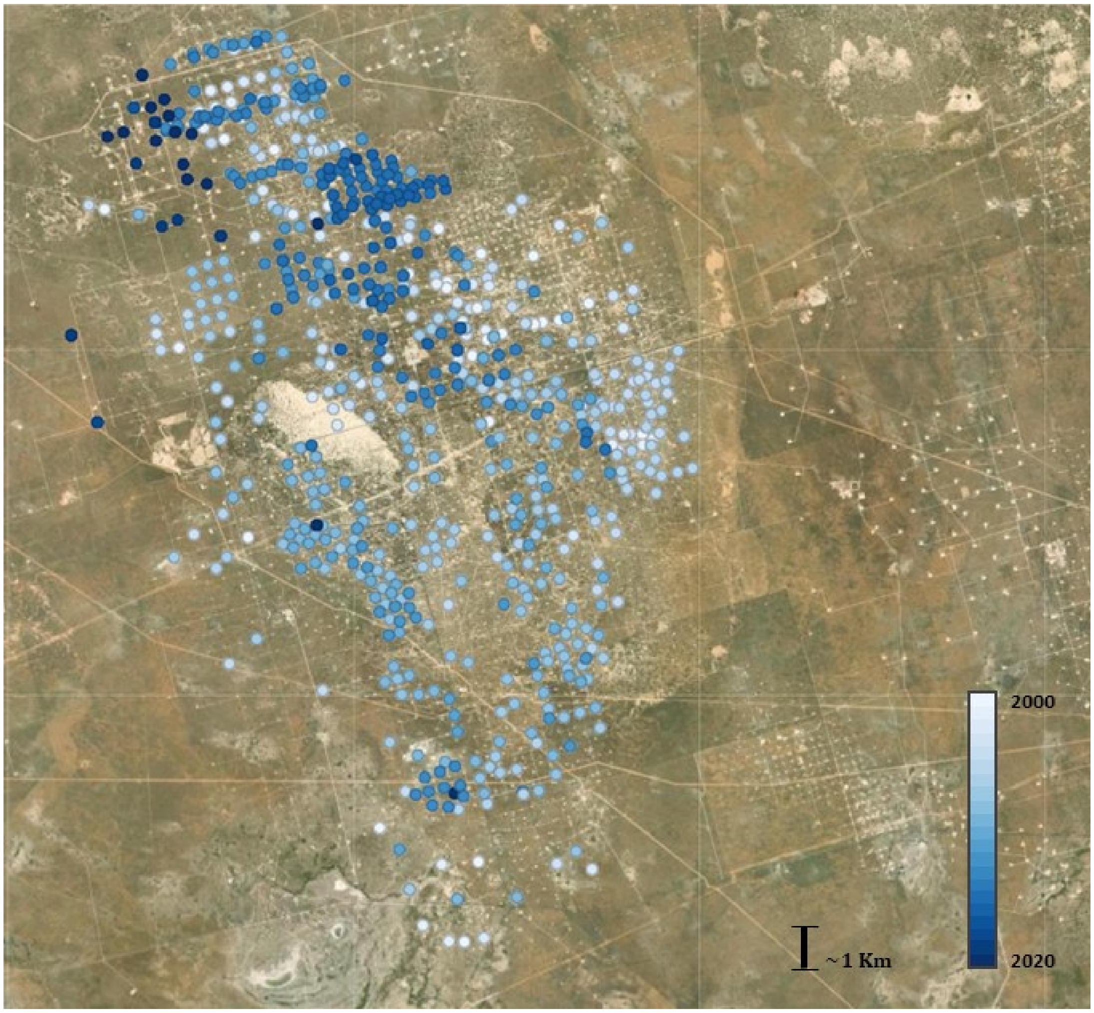


Figure 3: Oil and Gas Field Development

The figure plots the development of the Sandhill Field in Texas over the period 2000 to 2020, using the wells for which our dataset contains at least the spud date (i.e., the date the drilling for the well started). The figure illustrates that, on average, drilling activities generally starts in one section of the field, and then extend to other part of the field in a smooth and gradual fashion. The wells are color coded in different shades of blue to indicate the year during which they were drilled. For example, a well color coded in light blue denotes a well drilled in the earlier part of the sample, while a well color coded in darker shade of blue denotes a well that was drilled in the later part of the sample. The source of the figure is: https://www.enverus.com/.

FIGURE 4

Drilling Activity in the Vicinity of a CEO's Investment Land

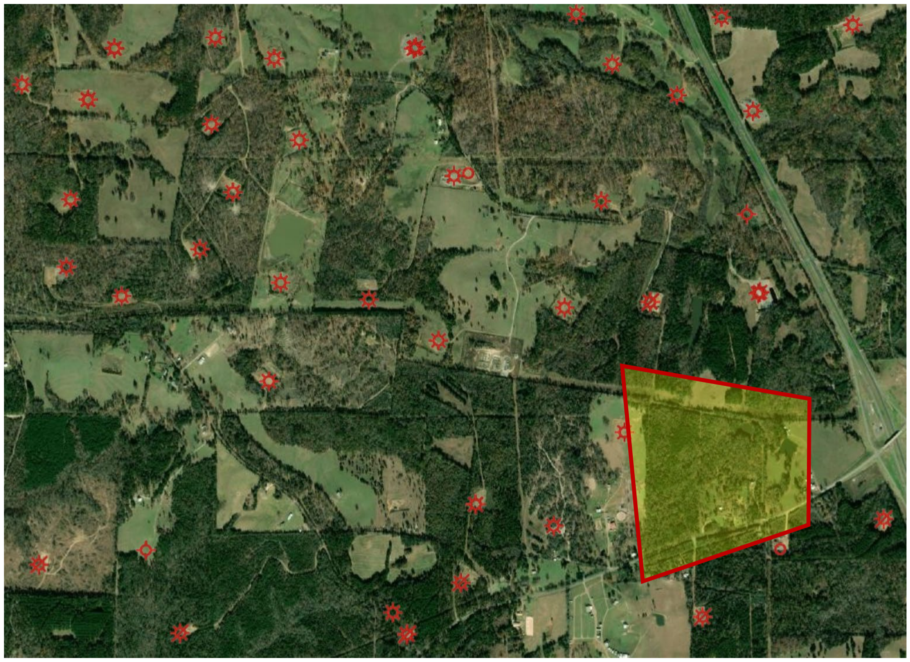


Figure 4: Drilling Activity in the Vicinity of a CEO's Investment Land
The figure represents a property included in our sample and the associated drilling activity in its vicinity. The yellow circle indicates the location of the property as indicated on google map. The property in the figure spans roughly 95.65 acres (i.e., ~0.4 km^2). Each red dot on the figure represents a distinct oil and gas well drilled during the sample period 2000 and 2020. The source of the figure is: https://www.enverus.com/.

TABLE 1

Summary Statistics

This table reports summary statistics. The sample consists of 298 firms, 412 CEOs, and 229,001 investment projects in the oil and gas industry engaged in onshore exploration and production of hydrocarbons in the continental United States during 2000–2020. Data sources, variable definitions, and sample selection criteria appear in Section 2, Appendix 2, and Table A.2, respectively.

Panel A: Firms						
Variable	**Mean**	**Std. Dev.**	**25th Pct.**	**Median**	**75th Pct.**	**No. Obs.**
All Firms						
Wells per Firm-State	259.81	542.03	10.00	60.00	243.00	823
No. State of Activity	2.76	2.21	1.00	2.00	3.00	298
Firm Budget (No. Wells per Year)	71.54	141.69	7.00	23.00	68.00	3,201
Total No. of Wells	591.65	1371.74	46.00	158.00	483.00	3,201
Private Firms						
Wells per Firm-State	125.74	224.03	6.00	39.00	158.00	417
No. State of Activity	1.93	1.31	1.00	1.00	2.00	215
Firm Budget (No. Wells per Year)	30.08	42.56	5.00	14.00	36.00	1,712
Total No. of Wells	205.63	304.22	31.00	109.00	246.00	1,712
Public Firms						
Wells per Firm-State	299.64	674.73	9.00	49.00	251.00	555
No. State of Activity	3.26	2.50	1.00	2.00	4.00	170
Firm Budget (No. Wells per Year)	115.53	176.86	14.00	46.00	136.00	1,489
Total No. of Wells	916.71	1,685.36	54.00	238.00	867.00	1,489
Financial Statistics (Compustat)						
Firm's Assets (Total Assets_t $ mil.)	16,175.88	41,524.73	869.64	3,196.55	11,728.84	1,489
Book Leverage ((Lt Debt_t + St Debt_t) / Total Assets_t)	0.31	0.16	0.20	0.30	0.41	1,489
Firm-level Investment Rate ($\text{Capex}_t/\text{Total Assets}_{t-1}$)	0.28	0.16	0.15	0.24	0.37	1,483
Market-to-Book (Market Equity_t/ Book Equity_t)	1.98	1.56	1.10	1.57	2.34	1,388
Return-on-Assets ($\text{Oibdp}_t/\text{Total Assets}_t$)	0.12	0.13	0.08	0.14	0.20	1,488
Number of Firms						
All Firms						298
Public						170
Private						128

Panel B: Projects

Variable	Mean	Std. Dev.	25th Pct.	Median	75th Pct.	No. Obs.
First Year of Production Value (Millions of $)	3.22	4.17	0.35	1.40	4.59	229,001
Project NPV (Millions of $)	1.76	5.57	-1.67	0.15	3.26	223,049
Profitability Index	2.61	5.58	0.40	1.09	2.42	223,049
Internal Rate of Return (in %)	70.37	196.29	-13.21	14.08	73.15	222,256
Cost (Millions of $)	3.40	2.16	1.55	3.71	4.91	223,049
Price of Oil ($ per Barrel)	70.91	27.24	48.47	73.04	94.51	229,001
Price of Natural Gas ($ per mcf)	4.96	2.26	3.32	4.24	6.22	229,001
Distance from Headquarters (in Km)	766.21	655.02	265.37	557.21	1,145.15	228,963
Number of Wells						
All Firms						229,001
Public						175,582
Private						53,419
Oil and Gas Activity						
No. Wells Per State	12,052.68	27,252.85	35.00	2,476.00	12,833.00	19
No. of States with O&G activity						19

Panel C: CEOs

Variable	Mean	Std. Dev.	25th Pct.	Median	75th Pct.	No. Obs.
Age	56.37	10.20	50.00	56.00	62.00	3,127
Tenure as CEO in the Firm	9.27	6.44	4.00	8.00	15.00	412
No. of Distinct States with Relatives	4.48	2.10	3.00	4.00	6.00	412
Number of CEOs						
All Firms						412
Public						236
Private						176
Female						4
Male						408
No. CEO with at least One Land Property						92
No. of Properties Owned (for those with at least one)	1.68	1.60	1.00	1.00	2.00	92

Variable - Education

Highest Degree	**No. Obs.**	**Proportion**	**Main Major**	**No. Obs.**	**Proportion**
None	8	2.2%	Engineering / Geology	127	65.1%
Undergraduate	235	63.2%	Science (Other)	6	3.1%
Master	27	7.3%	Business Administration	31	15.9%
JD	20	5.4%	Social Science	7	3.6%
MBA	69	18.5%	Law	21	10.8%
Ph.D.	12	3.2%	None	3	1.5%
Other	1	0.3%			
Total	372	100%	Total	195	100%
N.A.	40		**N.A.**	217	

Panel D: Properties

Variable	Mean	Std. Dev.	25th Pct.	Median	75th Pct.	No. Obs.
All Properties						
Market Land Value (Millions of $)	0.68	1.13	0.06	0.23	0.73	155
Total Market Value (Millions of $)	1.01	1.79	0.06	0.25	1.03	155
Land-to-Total Market Value (%)	83.01	18.80	64.59	97.10	100.00	155
Holding Period (Years)	11.57	8.46	5.00	9.00	17.00	155
Year of Acquisition	2003.99	8.64	1999	2005	2010	155
No. of Properties						
Total No. of Land						155
No. of Cities with Land						55

TABLE 2

CEO Properties and Firm Entry into Oil and Gas Fields

This table studies how the CEO's ownership of private investment assets adjacent to an oil and gas field is associated with the firm's entry into and commencement of drilling in the respective field. The dependent variable, *Enter* $_{i,r,t}$, is a binary indicator that equals 1 if firm *i* commences drilling activity in oil and gas field *r* in year *t*, and 0 otherwise. The variable of interest is *CEO's Personal Investment* $_{i,r,t}$, defined as a binary indicator that equals 1 if the CEO of firm *i* owns an investment property adjacent to oil and gas field *r* during year *t*, and 0 otherwise. An investment property is defined as a CEO's personal real estate investment, other than his primary residence, for which the value of vacant land accounts for at least 50% of the total property value and which is located within 20 kilometers from the nearest oil and gas well. Regressions are estimated as linear probability models with fixed effects. The investment opportunity set for a given firm consists of all active fields in a given year, where an active field is defined as a field with at least one active oil and gas exploration site in that year. *Field's Oil-to-Gas Ratio* is the averaged proportion of the field's production output of oil (in barrels) to the output of gas (in barrel-of-oil equivalents). *Field's Drilling Activity* is the total number of wells drilled in the field, divided by 10,000. *Field Distance from HQ* is the distance between the field's center point and the firm's headquarters, expressed in kilometers and divided by 10,000. *Investment Level* is the total number of wells drilled by the firm in a given year, divided by 10,000. Variable definitions and sample selection criteria appear in Appendix 2 and Table A.2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$Enter_{i,r,t}$ = 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal $Investment_{i,r,t}$	0.04**	0.04**	0.04**	0.04**	0.03**	0.03**	0.03**	0.03**
	(2.47)	(2.40)	(2.49)	(2.42)	(2.37)	(2.29)	(2.28)	(2.21)
(β_2) Field's Oil-to-Gas $Ratio_{r,t}$	-0.00**	-0.00*	-0.00	-0.00	-0.00***	0.00	0.00	
	(-2.50)	(-1.81)	(-0.03)	(-1.20)	(-4.30)	(1.42)	(1.38)	
(β_3) Investment $Level_{i,t}$	0.26***	0.10**	0.26***	0.10**	0.26***	0.09		
	(11.83)	(2.00)	(11.75)	(2.04)	(11.88)	(1.64)		
(β_4) Field's Drilling $Activity_{r,t}$	0.11***	0.11***	0.12***	0.11***	0.06***	0.06***	0.06***	
	(9.60)	(9.54)	(9.78)	(9.56)	(3.94)	(4.10)	(4.08)	
(β_5) Field Distance from $HQ_{i,r,t}$	-0.01**	-0.02***	-0.01**	-0.02***	-0.01*	-0.04***	-0.04***	-0.04***
	(-2.37)	(-7.48)	(-2.36)	(-7.30)	(-1.90)	(-6.76)	(-6.72)	(-5.94)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	No
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO*State FE	No	No	No	No	No	No	No	Yes
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.04
F-Statistics	53.40	32.43	52.08	33.13	36.43	14.35	17.67	19.64
No. Obs.	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,726	2,455,532

TABLE 3

Robustness: CEO Properties and the Decision to Enter an Oil and Gas Field

This table studies the decision of firms to enter a field depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "i" decides to enter an oil and gas producing field "r" during year "t" to start developing resources, and 0 otherwise. The variable of interest CEO's Personal Investment$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land adjacent to an oil and gas field "r" during year "t", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available fields as all the field that have active oil and gas exploration and production. For example, if drilling activity in field **A** starts in 2007, then we construct the panel data such that field **A** becomes an investment opportunity available to firms starting in 2007, and the field is not included in the sample during prior years. Once a firm enters a field, we drop that field from the sample for that specific firm. For **Panel A**, we exclude CEOs for which properties were acquired after the CEO took office. For **Panel B**, we exclude CEOs for which properties were bought after oil and gas reserves were discovered in the field. The controls and fixed effects apply to all robustness tests presented in Panel A, and B. Controls include *Field's Oil-to-Gas Ratio*, *Investment Level, Field's Drilling Activity,* and *Filed Distance from HQ*. Finally, Distance from HQ is a continuous variable measuring the distance between a field center point and the firm's headquarters in kilometers. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: Properties Acquired Before the CEO's Appointment	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal Investment$_{i,r,t}$	0.05**	0.05**	0.05**	0.05**	0.05**	0.05**	0.05**	0.04**
	(2.20)	(2.14)	(2.20)	(2.14)	(2.14)	(2.05)	(2.05)	(2.00)
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.04
F-Statistics	49.13	29.74	47.43	30.44	34.88	12.75	15.72	15.99
No. Obs.	2,162,502	2,162,502	2,162,502	2,162,502	2,162,502	2,162,502	2,162,494	2,162,305
Panel B: Before Oil Discovery	$Enter_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal Investment$_{i,r,t}$	0.02**	0.02**	0.02**	0.02**	0.02**	0.02*	0.02*	0.02*
	(2.21)	(2.07)	(2.21)	(2.09)	(2.11)	(1.91)	(1.93)	(1.82)
R^2	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.04
F-Statistics	49.20	28.70	46.81	29.22	36.22	12.80	15.79	16.18
No. Obs.	2,171,533	2,171,533	2,171,533	2,171,533	2,171,533	2,171,533	2,171,520	2,171,342

Additional Controls and Fixed Effects Included in Regressions for Each Panel:								
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	No
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO*State FE	No	No	No	No	No	No	No	Yes

TABLE 4

Instrumental Variable Analysis: Family Connections

This table studies the decision of firms to enter a field depending on having the CEO owning plots of land adjacent on oil and gas formations using a two-stage least square regression. The results in Panel A report coefficient estimates of the first stage regression. Panel B reports the instrumented results, and the first stage F-test statistic for the two-stage estimation is reported at the bottom of panel B. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "i" decides to enter an oil and gas field "r" during year "t" to start developing resources, and 0 otherwise. The variable of interest CEO's Personal Investment$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas field "r" during year "t", and 0 otherwise. The Family Connection instrument is equal to 1 if one of the CEO's relative resides within 20 kilometers from an oil and gas field, and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available fields as all the fields that have active oil and gas production each year. For example, if drilling activity in field **A** starts in 2007, then we construct the panel data such that field **A** becomes an investment opportunity for the firms starting in 2007, and the field is not included in the sample during prior years. Once a firm enters a field, we drop that field from the sample. Finally, Field Distance from HQ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: First Stage	CEO's Personal Investment$_{i,r,t}$ = 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) Family Connection$_{r,t}$	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
	(3.52)	(3.51)	(3.52)	(3.51)	(3.31)	(3.30)	(3.30)	(3.28)
(β_2) Field's Oil-to-Gas Ratio$_{r,t}$	-0.00	-0.00	-0.00*	-0.00	0.00	0.00*	0.00*	
	(-1.44)	(-1.29)	(-1.78)	(-1.25)	(1.32)	(1.70)	(1.67)	
(β_3) Investment Level$_{i,t}$	0.00	0.00	0.00	-0.00	0.00	-0.00		
	(1.08)	(0.30)	(1.15)	(-0.50)	(1.28)	(-0.86)		
(β_4) Field's Drilling Activity$_{r,t}$	0.03***	0.03***	0.03***	0.03***	-0.01**	-0.01**	-0.01**	
	(2.95)	(2.95)	(2.95)	(2.95)	(-2.06)	(-2.11)	(-2.08)	
(β_5) Field Distance from HQ$_{i,r,t}$	-0.00**	-0.00***	-0.00**	-0.00***	-0.00**	-0.00***	-0.00***	-0.02***
	(-2.44)	(-4.51)	(-2.37)	(-4.48)	(-2.03)	(-3.87)	(-3.89)	(-3.92)
Panel B: Second Stage	Enter$_{i,r,t}$ = 1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) $\widehat{\text{CEO's Personal Investment}}_{i,r,t}$	0.38***	0.35**	0.37***	0.35**	0.41**	0.37**	0.37**	0.28**
	(2.60)	(2.55)	(2.60)	(2.55)	(2.48)	(2.42)	(2.43)	(2.32)
(β_2) Field Oil-to-Gas Ratio$_{r,t}$	-0.00**	-0.00*	0.00	-0.00	-0.00***	0.00	0.00	
	(-2.39)	(-1.71)	(0.14)	(-1.09)	(-4.40)	(1.25)	(1.22)	
(β_3) Investment Level$_{i,t}$	0.26***	0.10**	0.26***	0.10**	0.26***	0.09*		
	(11.65)	(2.00)	(11.59)	(2.05)	(11.69)	(1.66)		
(β_4) Field 's Drilling Activity$_{r,t}$	0.10***	0.10***	0.11***	0.10***	0.06***	0.07***	0.07***	
	(7.41)	(7.53)	(7.62)	(7.55)	(4.20)	(4.34)	(4.32)	
(β_5) Field Distance from HQ$_{i,r,t}$	-0.01**	-0.02***	-0.01**	-0.02***	-0.01*	-0.03***	-0.03***	-0.03***
	(-2.32)	(-7.22)	(-2.30)	(-7.03)	(-1.86)	(-6.45)	(-6.42)	(-4.67)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	No
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO*State FE	No	No	No	No	No	No	No	Yes
First Stage F-test (Kleibergen-Paap)	12.36	12.32	12.36	11.08	10.97	10.91	10.90	10.74
No. Obs.	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,726	2,455,532

TABLE 5

Investment Intensity in Oil Fields Adjacent to CEOs' Properties

This table studies the investment rate of firms depending on having the CEO owning plots of land located on oil and gas fields using a OLS regression. The dependent variable, $\text{Investment Rate}_{i,r,t+1}$ denotes firm "i" investment (in number of wells) in field "r" during year "t+1" scaled by the firm's total number of active wells at time "t" such that $\text{Investment Rate}_{i,r,t+1}$ = $\text{No. Wells Drilled}_{i,r,t+1}/\text{Total No. Active Wells}_{i,t}$ *100. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on the oil and gas field "r" during year "t", and 0 otherwise. Field average production denotes the average well's production value of firm "i" in field "r" on year "t". Finally, Field Distance from HQ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The t-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Investment Rate}_{i,r,t+1}$ (%)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) $\text{CEO's Personal Investment}_{i,r,t}$	12.63**	8.78**	8.14*	6.89**	7.98*	6.41*	8.11**	6.82**
	(2.58)	(2.25)	(1.97)	(2.18)	(1.82)	(1.68)	(1.99)	(2.21)
(β_2) $\text{CEO's Perso. Inv.}_{i,r,t}$ x $\text{Field Avg. Prod. Value}_{i,r,t}$	-1.96**	-1.66*	-1.99*	-1.36**	-1.91**	-1.65*	-1.97*	-1.36**
	(-2.29)	(-1.92)	(-1.90)	(-2.49)	(-2.22)	(-1.82)	(-1.89)	(-2.51)
(β_3) $\text{Field Oil-to-Gas Ratio}_{i,r,t}$	1.49***	0.62**	-0.07	0.36	1.01**	0.67**	-0.07	0.35
	(3.02)	(2.06)	(-0.11)	(0.44)	(2.26)	(2.33)	(-0.11)	(0.42)
(β_4) $\text{Field Avg. Prod. Value}_{i,r,t}$	-0.15***	0.02	0.16***	0.13**	-0.06**	0.05***	0.16***	0.13**
	(-4.52)	(1.19)	(3.04)	(2.53)	(-2.19)	(2.82)	(3.07)	(2.51)
(β_5) $\text{Investment Level}_{i,t}$					-48.40***	19.69***	21.90**	
					(-4.37)	(3.06)	(2.51)	
(β_6) $\text{Field 's Drilling Activity}_{r,t}$					51.11***	33.67***		
					(9.87)	(8.59)		
(β_7) $\text{Field Distance from HQ}_{i,r,t}$					-4.47**	0.42	-2.83	-7.40
					(-2.26)	(0.34)	(-0.77)	(-1.02)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
CEO FE	No	Yes	Yes	Yes	No	Yes	Yes	No
Field FE	No	No	Yes	No	No	No	Yes	No
Firm*Year FE	No	No	No	Yes	No	No	No	Yes
Field*Year FE	No	No	Yes	Yes	No	No	Yes	Yes
CEO*State FE	No	No	No	No	No	No	No	Yes
R^2	0.04	0.48	0.69	0.74	0.16	0.50	0.70	0.74
F-Statistics	8.22	2.43	3.52	2.95	17.14	17.59	3.22	2.36
No. Obs.	14,406	14,378	7,291	6,269	14,403	14,376	7,291	6,269

TABLE 6

CEO's Personal Investment and Project Outcomes: Initial Output

This table studies the firms' projects production value firms depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, Well's Production Value$_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. Well's Production Value$_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. The variable of interest CEO's Personal Investment$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, Well'sDistance from HQ is a continuous variable measuring the distance between a well and the firm's headquarters in kilometers. CEO's State FE is equal to 1 if the well has been drilled in CEO's state of origin (i.e., the state associated with the first 3 digits of the CEO's social security number), and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	Well's Production Value$_{z,i,r,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal Investment$_{i,r,t}$	-0.62***	-0.61***	-0.53***	-0.52***	-0.70**	-0.70**	-0.50**	-0.38*
	(-3.62)	(-3.62)	(-2.92)	(-3.00)	(-2.39)	(-2.40)	(-2.02)	(-1.78)
(β_2) Well's Oil-to-Gas Ratio$_{z,i,r,t}$	0.68***	0.75***	0.68***	0.75***	0.88***	0.88***	1.35***	1.40***
	(2.96)	(3.30)	(3.07)	(3.40)	(5.80)	(5.80)	(8.85)	(9.29)
(β_3) Well's Distance from HQ$_{z,i,r,t}$			2.89*	2.45	-1.56**	-1.57**	-0.99	-1.65**
			(1.71)	(1.42)	(-2.00)	(-1.99)	(-1.51)	(-2.14)
(β_4) Firm Investment$_{i,t}$			-6.60**	-8.35***	-0.77	-0.77	-1.77	
			(-1.97)	(-2.60)	(-0.39)	(-0.39)	(-1.39)	
(β_5) Township Drilling Activity$_{r,t}$			21.75**	25.23**	25.71***	25.68***		
			(2.00)	(2.33)	(3.61)	(3.57)		
Firm FE	No	Yes	No	Yes	Yes	Yes	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	No	No	No	No	Yes	Yes	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO's State FE	No	No	No	No	No	Yes	Yes	Yes
Firm*Year FE	No	No	No	No	No	No	No	Yes
Township*Year FE	No	No	No	No	No	No	Yes	Yes
R^2	0.51	0.51	0.51	0.51	0.67	0.67	0.77	0.78
F-Statistics	10.09	10.92	6.59	8.10	9.81	9.73	20.13	29.30
No. Obs.	228,198	228,198	228,160	228,160	227,196	227196	217,444	217,286

TABLE 7

CEO's Inherited Properties and Project Outcomes: Initial Output

This table studies the firms' projects production value firms depending on having the CEO owning plots of land that was inherited located on oil and gas formations using an OLS regression. The dependent variable, $\text{Well's Production Value}_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. $\text{Well's Production Value}_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*" and that property was inherited from the CEOs' parents, and 0 otherwise. For a property to be defined as inherited, it must have been owned by the CEO's parents before they died, and then owned by the CEO. Finally, Well's Distance from HQ is a continuous variable measuring the distance between a well and the firm's headquarters in kilometers. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Well's Production Value}_{z,i,r,t}$			
	(1)	(2)	(3)	(4)
(β_1) $\text{CEO's Personal Investment}_{i,r,t}$	-0.62***	-0.61***	-0.53***	-0.52***
	(-3.62)	(-3.62)	(-2.92)	(-3.00)
(β_2) $\text{Well's Oil-to-Gas Ratio}_{z,i,r,t}$	0.68***	0.75***	0.68***	0.75***
	(2.96)	(3.30)	(3.07)	(3.40)
(β_3) $\text{Well's Distance from HQ}_{z,i,r,t}$			2.89*	2.45
			(1.71)	(1.42)
(β_4) $\text{Firm Investment}_{i,t}$			-6.60**	-8.35***
			(-1.97)	(-2.60)
(β_5) $\text{Township Drilling Activity}_{r,t}$			21.75**	25.23**
			(2.00)	(2.33)
Firm FE	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
CEO FE	Yes	Yes	Yes	Yes
Technology FE	Yes	Yes	Yes	Yes
R^2	0.51	0.51	0.51	0.51
F-Statistics	10.09	10.92	6.59	8.10
No. Obs.	228,198	228,198	228,160	228,160

TABLE 8

CEO's Personal Investment and Project Outcomes: IRR and Estimated NPV

This table studies the firms' projects NPV depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The first dependent variable $\text{Project's IRR}_{z,i,r,t}$ represent the projects internal rate of return, based on the expected production of each well using the Arp model. The second dependent variable, $\text{Estimated NPV}_{z,i,r,t}$ denotes the estimated NPV of well "z" drilled by firm "i" in township "r" during year "t" in millions of dollars. $\text{Estimated NPV}_{z,i,r,t}$ is defined as: $(\frac{\text{Well's Production Value}*(1-\text{FC})}{Depletion\ Rate+Discount\ Rate} - Cost)/1{,}000{,}000$. A full description and motivation of the calculation is available in Appendixes A1. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. Finally, $\text{Well'sDistance from HQ}$ is a continuous variable measuring the distance between a well and the firm's headquarters in kilometers. CEO's State FE is equal to 1 if the well has been drilled in CEO's state of origin (i.e., the state associated with the first 3 digits of the CEO's social security number), and 0 otherwise. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Project's IRR}_{z,i,r,t}$				$\text{Estimated NPV}_{z,i,r,t}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) $\text{CEO's Personal Investment}_{i,r,t}$	-0.18**	-0.18**	-0.04	-0.09**	-1.11***	-1.11***	-0.63*	-0.57*
	(-2.03)	(-1.99)	(-0.68)	(-2.31)	(-2.67)	(-2.70)	(-1.71)	(-1.95)
(β_2) $\text{Well's Oil-to-Gas Ratio}_{z,i,r,t}$	-0.15*	-0.15*	0.03	0.05	1.34***	1.34***	2.15***	2.26***
	(-1.79)	(-1.80)	(0.40)	(0.79)	(5.00)	(5.00)	(8.15)	(8.51)
(β_3) $\text{Well's Distance from HQ}_{z,i,r,t}$	0.22	0.19	-0.26	-0.71***	-1.59	-1.59	-0.90	-2.05*
	(0.44)	(0.38)	(-1.17)	(-2.67)	(-1.49)	(-1.46)	(-0.89)	(-1.70)
(β_4) $\text{Firm Investment}_{i,t}$	-2.70**	-2.70**	-1.34***		-0.70	-0.70	-1.74	
	(-2.44)	(-2.44)	(-2.70)		(-0.21)	(-0.21)	(-0.80)	
(β_5) $\text{Township Drilling Activity}_{r,t}$	-0.74	-0.84			20.25	20.26		
	(-0.15)	(-0.17)			(1.49)	(1.48)		
Firm FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	Yes	Yes	No	No	Yes	Yes	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO's State FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Firm*Year FE	No	No	No	Yes	No	No	No	Yes
Township*Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.56	0.56	0.73	0.74	0.53	0.53	0.66	0.67
F-Statistics	3.98	3.90	2.41	3.79	5.81	5.82	17.35	25.37
No. Obs.	221,241	221,241	211,740	211,588	221,241	221,241	211,740	211,588

TABLE 9

Corporate Governance and the Outcomes of CEO Pet Projects

This table studies the firms' projects production value depending on having the CEO owning plots of land located on oil and gas formations using an OLS regression. The dependent variable, Well's Production Value$_{z,i,r,t}$, denotes the value of well "z" first year of production drilled by firm "i" in township "r" during year "t" in millions of dollars. Well's Production Value$_{z,i,r,t}$ is defined as: (Gas Production * Gas Price + Oil Production * Oil Price)/1,000,000, in the first year of operation of the well. The variable of interest CEO's Personal Investment$_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on oil and gas field "*r*" during year "*t*", and 0 otherwise. For **Panel A**, Separation of Chair and CEO$_{i,t}$ is a dummy equal to 1 if the CEO is not the chairman, and 0 otherwise. For **Panel B**, Owner. Concent.$_{i,t}$ is the shareholder HHI index. For **Panel C**, Private$_{i,t}$ is a dummy variable equal to 1 if the firm is privately held, and 0 otherwise. Controls include Well's Oil-to-gas ratio, Well's Distance from HQ, Firm Investment level, and Township Drilling Activity. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

Panel A: CEO Duality	Well's Production Value$_{z,i,r,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal Investment$_{i,r,t}$	-0.79***	-0.76***	-0.69***	-0.66***	-1.10***	-1.10***	-0.89***	-0.74***
	(-6.70)	(-7.01)	(-5.82)	(-5.50)	(-3.93)	(-3.88)	(-4.12)	(-4.00)
(β_2) CEO's Perso. Inv.$_{i,r,t}$ $*$ Separation of Chair and CEO$_{i,t}$	0.64***	0.61***	0.69***	0.62***	0.69**	0.70**	0.93***	1.26***
	(3.48)	(3.36)	(3.90)	(3.54)	(2.01)	(2.01)	(3.01)	(3.55)
(β_3) Separation of Chair and CEO$_{i,t}$	-0.18	-0.02	-0.18	0.03	0.03	0.03	0.07	
	(-0.74)	(-0.09)	(-0.70)	(0.12)	(0.12)	(0.12)	(0.45)	
F-Statistics	13.56	15.11	19.07	21.05	8.97	9.03	14.04	21.25
No. Obs.	186,658	186,658	186,658	186,658	185,739	185,739	177,606	177,515

Panel B: Ownership Concentration	Well's Production Value$_{z,i,r,t}$							
(β_1) CEO's Personal Investment$_{i,r,t}$	-0.94***	-0.90***	-0.91***	-1.38***	-0.82***	-0.76***	-0.90***	-1.39***
	(-6.52)	(-6.23)	(-3.11)	(-4.57)	(-5.21)	(-4.85)	(-3.20)	(-4.63)
(β_2) CEO's Perso. Inv.$_{i,r,t}$ x Owner. Concent.$_{i,t}$	0.04***	0.03**	0.06***	0.20***	0.04**	0.03**	0.06***	0.20***
	(2.90)	(2.59)	(2.70)	(6.07)	(2.46)	(1.99)	(2.65)	(6.11)
(β_3) Ownership Concentration$_{i,t}$	-0.01	-0.00	-0.02***		-0.01	-0.00	-0.02***	
	(-0.93)	(-0.19)	(-2.68)		(-0.93)	(-0.08)	(-2.68)	
F-Statistics	14.51	14.40	21.31	34.41	15.57	15.73	15.00	26.04
No. Obs.	158,933	158,933	150,904	150,872	158,933	158,933	150,904	150,872

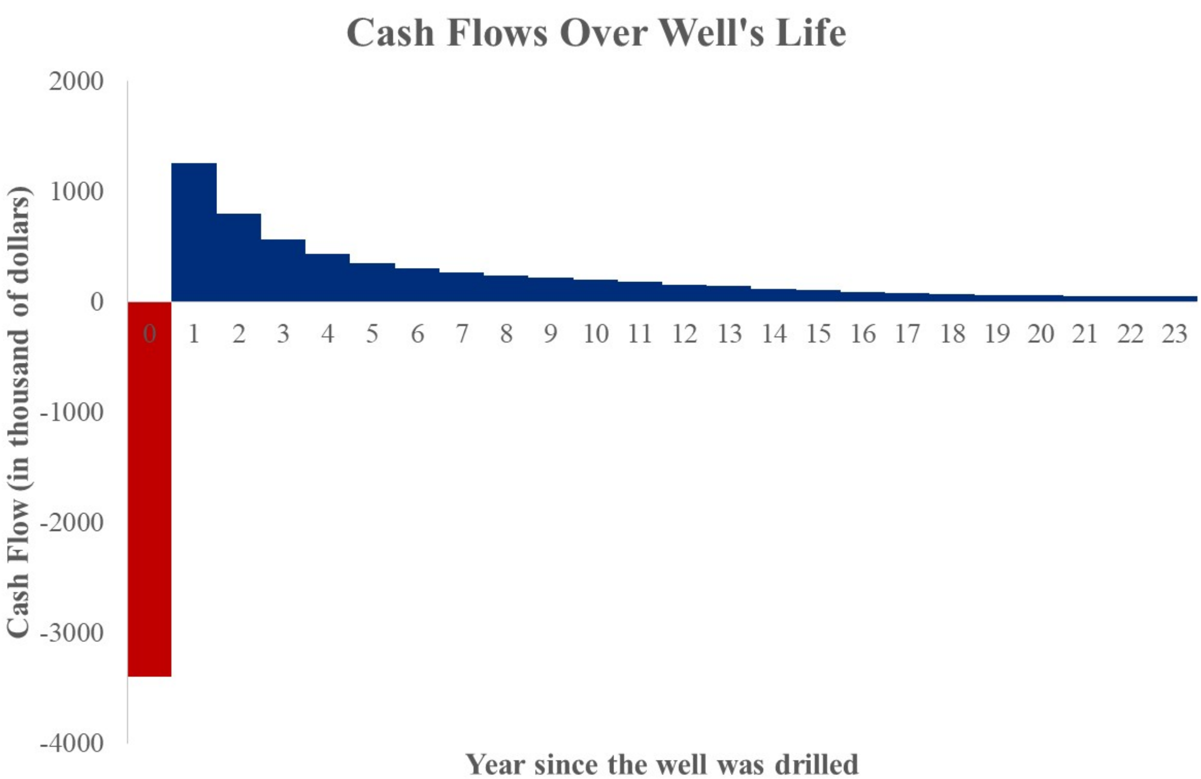
Panel C: Public VS. Private Firms	Well's Production Value$_{z,i,r,t}$							
(β_1) CEO's Personal Investment$_{i,r,t}$	-0.84***	-0.81***	-0.74***	-0.50***	-0.75***	-0.71***	-0.74***	-0.52***
	(-9.70)	(-9.16)	(-3.21)	(-2.67)	(-7.52)	(-6.82)	(-3.30)	(-2.79)
(β_2) CEO's Perso. Inv.$_{i,r,t}$$*$ Private$_{i,t}$	0.95***	0.83***	1.05***	1.09**	0.90***	0.77***	1.04***	1.09**
	(3.58)	(3.14)	(3.10)	(2.41)	(3.54)	(3.00)	(3.11)	(2.42)
(β_3) Private$_{i,t}$	-0.47	-0.02	-0.30**		-0.42	-0.02	-0.32**	
	(-1.39)	(-0.07)	(-2.37)		(-1.31)	(-0.06)	(-2.48)	
F-Statistics	25.64	22.93	22.32	29.01	22.99	19.50	15.17	21.96
No. Obs.	228,198	228,198	217,462	217,300	228,160	228,160	217,444	217,286

Additional Controls and Fixed Effects Included in Regressions for Each Panel:

Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	Yes	No	No	Yes	Yes	No
Year FE	Yes	Yes	No	No	Yes	Yes	No	No
CEO FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Township FE	No	No	No	No	No	No	No	No
Technology FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO's State FE	No	No	Yes	Yes	No	No	Yes	Yes
Firm$*$Year FE	No	No	No	Yes	No	No	No	Yes
Township$*$Year FE	No	No	Yes	Yes	No	No	Yes	Yes

Appendix 1: Methodology to Measure Projected NPV

One of the principal features of oil and gas well regarding production over time relates to the notion of reserves depletion. The production starts at an initial level when the well just got drilled, and then over time the production declines.



To obtain an estimate of the wells projected NPV we rely on the Arp model, a petroleum production model (Fetkovich et al., 1996), to measure the average depletion rate of the wells in our sample. Using the exponential Arp model, one can approximate the net discounted value of an oil and gas well by measuring:

$$\text{Projected NPV} = \int_0^{\infty} Prod_0 * (1 - FC) * e^{-(d+r)t}\, dt - Cost$$

Where $Prod_0$ corresponds to the value of the production in the first year, "FC" are the flexible cost associated with the overall operations of the wells (in proportion of the production), "d" denotes the depletion rate of production (i.e., the speed at which production declines over time), "r" is the discount rate used to evaluate the well, "t" corresponds to the number of months since the well was drilled, and Cost is the cost of drilling the well. Without loss of generality, we can approximate the Project NPV over the range 0 to infinity given that the annual depletion rate for the wells in the sample is 0.23 and 0.42 for the wells drilled using vertical and horizontal technology, respectively. Such high depletion rate numbers combined with a discount rate of 10% imply that the estimated production value for periods that take place further into the future are close to zero (e.g., the discounted value of production on year 10 is roughly 99% smaller than on year 1). It is thus reasonable to approximate wells' projected NPV by computing:

$$\text{Projected NPV} = \left(\frac{Prod_0 * (1-FC)}{d+r} - Cost\right).$$

To obtain an estimate, for each well we define $Prod_0$= First Year Production of Natural Gas * Natural Gas Price + First Year Production of Oil * Oil Price, FC is set to 20% following the methodology of Decaire et al. (2020), "r" is set to 10% following Kellogg (2014) and Decaire et al. (2020). Then, considering that our sample contains two different types of drilling technologies, vertical and horizontal, we separately estimate the average depletion rate for each technology in the sample using the Arp Exponential model such that:

$$E[d] = E\left[\frac{\text{Ln}(Prod_0) - \ln(Prod_t)}{t}\right]$$

Finally, to obtain an estimate of the wells' drilling cost, we use hand collected data, and estimate the year drilling cost average for each technology, respectively. The drilling cost data spans the period 2000-2017, excluding from our analysis the last 3 years of the sample.

Appendix 2: Variables Description

Dependent Variables	**Definition**
$\text{Exit}_{i,r,t}$	Dummy variable equal to 1 if firm "i' exited field "r" on year "t", and 0 otherwise. For an exit to be recorded in the sample, we require that firms are not active in that field for at least 2 years.
$\text{Enter}_{i,r,t}$	Dummy variable equal to 1 if firm "i' entered field "r" on year "t", and 0 otherwise.
$\text{Investment Rate}_{i,r,t+1}$ (%)	A variable that corresponds to the number of wells drilled by firm "i" in field "r" during year "t+1" scaled by the total number of active wells of the firm during the prior period, such that: $\text{Investment Rate}_{i,r,t+1} = \frac{\text{No. Wells Drilled}_{i,r,t+1}}{\text{Total No. Active Wells}_{i,t}} * 100.$
$\text{Projected NPV}_{z,i,r,t}$	Defined as: $(\frac{\text{Well's Production Value}*(1-FC)}{\text{Depletion Rate}+\text{Discount Rate}} - \text{Cost})/100{,}000.$
$\text{Projected IRR}_{z,i,r,t}$	Defined as the IRR value that solves: $\frac{\text{Well's Production Value}*(1-FC)}{\text{Depletion Rate}+\text{IRR}} - \text{Cost} = 0.$
$\text{Royalty Rate (\%)}_{r,t}$	The average royalty rate in township "r" on year "t". The royalty rate is the main term included in mineral right leasing contracts. It corresponds to the fraction of the well's produced cash flow that the landowner will receive once a well is drilled.
$\text{Signing Bonus Per Acres}_{r,t}$	The average signing bonus per acres in township "r" on year "t".
$\text{Well's Production Value}_{z,i,r,t}$	Measures the value of the first year of production of the well by computing: First Year Production of Natural Gas * Natural Gas Price + First Year Production of Oil * Oil Price scaled by $1,000,000.
Variable of Interest	
$\text{CEO's Personal Investment}_{i,r,t}$	A dummy variable equal to 1 if CEO "i" owns a plot of land on an oil and gas formation "r" during year "t", and 0 otherwise.
Control Variables	
CEO's State Fixed Effects	Fixed effect to control for if the well has been drilled in CEO's state of origin (i.e., the state associated with the first 3 digits of the CEO's social security number).
$\text{Field's Distance from HQ}_{i,r,t}$	Distance in kilometers between a field "r" centerpoint and the firm's headquarters, scaled by 10,000.
$\text{Drilling Activity}_{r,t}$	A dummy variable equal to 1 if there was already some drilling activity at the time of signing the lease, and 0 otherwise.
$\text{Field's Drilling Activity}_{r,t}$	Total number of wells drilled in field "r" on year "t" scaled by 10,000.
$\text{Field's Oil-to-Gas Ratio}_{i,r,t}$	Measure the averaged proportion of the wells production that is attributable to oil at the firm-field-year level such that: Oil-to-Gas $\text{Ratio}_{i,r,t} = \text{ Average First Year Prod. Oil }_{i,r,t}/$ $(\text{Average First Year Prod. Oil }_{i,r,t} +$

	$\text{Average First Year Prod. Gas}_{i,r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
Field's Oil-to-Gas $\text{Ratio}_{r,t}$	Measure the averaged proportion of the wells production that is attributable to oil at the field-year level such that: Oil-to-Gas $\text{Ratio}_{r,t} = \text{Average First Year Prod. Oil}_{r,t}/(\text{Average First Year Prod. Oil}_{r,t} + \text{Average First Year Prod. Gas}_{r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
$\text{Field Avg. Prod. Value}_{i,r,t}$	Average well's production value of firm "i" in field "r" on year "t".
$\text{Investment Level}_{i,t}$	A variable that corresponds to the number of wells drilled by firm "i" during year "t", scaled by 10,000.
$\text{Private}_{i,t}$	A dummy equal to 1 if the firm reports in Compustat, and 0 otherwise.
$\text{Family Connection}_{i,r}$	Dummy variable equal to 1 if the CEO of firm "i" has at least one relative with a recorded address that is located within 20 kilometers from field "r".
Technology Fixed Effects	Fixed effect to control for the different production technology of the wells: (1) vertical, (2) horizontal drilling technology.
Township	A ~ 6 miles per 6 miles squares of land, following the Public Land Survey System definition of a Township. For each well, we round the GPS coordinates (latitude and longitude are in WGS84 format) to the 0.1 decimal, and construct synthetic township based on these rounded coordinates.
$\text{Township Prod. Value}_{r,t}$	Average wells' production value of township "r" on year "t".
$\text{Township Drilling Activity Dummy}_{r,t}$	A dummy variable equal to 1 if there is at least 1 well drilled in the township, and 0 otherwise.
$\text{Township Drilling Activity}_{r,t}$	Total number of wells drilled in township "r" on year "t" scaled by 10,000.
$\text{Well's Distance from HQ}_{z,i,r,t}$	Distance in kilometers between a well "z" and the firm's headquarters, scaled by 10,000.
Well's Oil-to-Gas $\text{Ratio}_{z,i,r,t}$	Measure the proportion of the well production that is attributable to oil at the firm-field-year level such that: Oil-to-Gas $\text{Ratio}_{z,i,r,t} = \text{First Year Prod. Oil}_{z,i,r,t}/(\text{First Year Prod. Oil}_{z,i,r,t} + \text{First Year Prod. Gas}_{z,i,r,t}/6)$. Natural gas production is divided by 6 to follow SEC standard and work with standardize unit (Barrel of Oil Equivalent "BOE").
WRDS Measures	
Book Equity ($Be_{i,t}$)	$\text{Seq}_{i,t}$ + $\text{Txdb}_{i,t}$ + $\text{Itcb}_{i,t}$ - $\text{Pref}_{i,t}$. $Pref_{i,t}$ = $\text{Pstkrv}_{i,t}$. If $\text{Pstkrv}_{i,t}$ is missing, we define the preferred shares such that $\text{Pref}_{i,t}$= $\text{Pstkl}_{i,t}$, and if $\text{Pstkl}_{i,t}$ is also missing, we define it as $\text{Pref}_{i,t}$ = $\text{Pstk}_{i,t}$.

Separation of Chair and $CE_{i,t}$	A dummy variable equal to 1 if the CEO is not the chairman of the firm "i" on year "t", and 0 otherwise. We obtain the data on CEOs chairman appointment from BoardEx database on WRDS.
"Compustat" Firm $Size_{i,t}$	Natural logarithm of firm total assets (at), using Compustat financial data.
"Compustat" Investment $Rate_{i,r,t+1}$ (%)	$\frac{Capx_{i,t}}{Ppent_{i,t}} * 100$
Leverage $(Book)_{i,t}$	$(Dlc_{i,t}+Dltt_{i,t})/At_{i,t}$.
Market Equity ($Me_{i,t}$)	$Prcc\_f_{i,t} * Csho_{i,t}$.
$Market - to - Book_{i,t}$	$Me_{i,t}/ Be_{i,t}$, if Book Equity is greater than 0.
Ownership $Concentration_{i,t}$	Ownership concentration as measured by the Herfindahl index of firm "i" on year "t". Larger values indicate that the ownership of the firm is more concentrated. For each firm-year, we measure the Herfindahl index such that $\text{Ownership Concentration}_{i,t} = \sum_k (\frac{\text{Share Owned}_{k,i,t}}{\text{Share Outstanding}_{i,t}})^2$, where "k" denotes a specific institutional investor, "i" indicates a firm, and "t" indexes the year of the calculation. To calculate the measure, we use the 13f dataset from Thompson Reuters on WRDS.
Return-on-Assets ($ROA_{i,t}$)	$Oibdp_{i,t} / At_{i,t}$.

Internet Appendix

CEO Pet Projects

Paul H. Décaire and Denis Sosyura

This Internet Appendix presents additional empirical results and some results to assess the robustness of our key results.

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- **Table A.1** studies the relation between the start of drilling activity in a township and the lease terms landowners obtain when selling/leasing their mineral rights to oil and gas companies.
- **Table A.2** shows the effect of the different filters we apply to the data on the sample size.
- **Table A.3** Version of Table 2 using an alternative method to identify which property is a plot of land located on an oil and gas producing formation such that the property must have at least 1 oil and gas well within 10 kilometers from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and excluding properties for which that ratio of land value to total value is smaller than 99%.
- **Table A.4** Test of the extensive margin focused on the firm decision to exit a field.
- **Table A.5** Version of Table 2 using an alternative econometric specification (Cox duration model) to evaluate the relation between CEO's personal investment and the time it takes for firms to enter a particular field for exploration and production of fossil fuel.
- **Table A.6** Test for the effect of managerial slack on CEOs unconditional decision to tunnel resources for their personal monetary benefit.

TABLE A.1

Drilling Activity and Landowner's Monetary Gains

This table presents the relation between drilling activity and the terms landowners obtain when leasing their land using an OLS regression. The first dependent variable, $\text{Royalty Rate (\%)}_{r,t}$, denotes the percentage of the wells revenues the landowners is expected to receive from the drilling company. For example, if the royalty rate is 18%, it means that the landowner will receive 18% of the cash flow generate by the well. The second dependent variable, $\text{Signing Bonus Per Acres}_{r,t}$, corresponds to the amount of money landowners receive at the moment of signing the lease, per acre. For example, if the bonus per acre is 10$ and a land landowners lease 1000 acres, he would receive $10,000. The main variable of interest, $\text{Drilling Activity}_{r,t}$, is a dummy variable equal to 1 if there is already some drilling activity in the township at the time the lease was signed, and 0 otherwise. In the alternative specification, the variable of interest is $\text{No. of Wells in Township}_{r,t}$, which denotes the natural logarithm of the total number of wells drilled in the township up to the moment the lease was signed. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Royalty Rate (\%)}_{r,t}$				$\text{Signing Bonus Per Acres}_{r,t}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) $\text{Township Drilling Activity Dummy}_{r,t}$	0.52***	0.43***			18.61***	13.04***		
	(5.53)	(4.28)			(3.66)	(3.10)		
(β_2) $\text{Township Drilling Intensity}_{r,t}$			0.35***	0.31***			17.27***	15.34**
			(8.73)	(7.40)			(2.92)	(2.38)
(β_3) $\text{Township Prod. Value}_{r,t}$		0.06***		0.03**		3.52***		2.12*
		(3.62)		(2.01)		(3.96)		(1.87)
Township FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.50	0.50	0.50	0.50	0.10	0.10	0.10	0.10
F-Statistics	30.54	24.25	76.27	40.42	13.40	8.61	8.55	10.66
No. Obs.	128,883	128,883	128,883	128,883	128,883	128,883	128,883	128,883

TABLE A.2

Sample Construction

This table shows the sample selection criteria and the number of firms, CEOs, and projects screened out by each sample filter. The sample period is from 2000 to 2020.

Sample	**Firms**	**CEOs**	**Projects**
Firms with information about their CEOs	318	452	254,842
- Firms with incomplete information on CEOs*	20	32	4,876
- Projects with incomplete information	0	8	20,965
= Final Sample	298	412	229,001

* Information on CEOs real estate holding is missing if CEOs are not included in LexisNexis dataset. This is the case for 32 CEOs in our sample, because they are living outside the US and they manage foreign firms.

TABLE A.3

Robustness: Alternative Definition of CEO Investment Properties

This table studies the decision of firms to enter field depending on having the CEO owning plots of land located on oil and gas formations using a OLS regression. For a property to be include in the sample, it must have at least 1 oil and gas well within 10 kilometers from the GPS coordinate provided by the Census data using R (package "tidygeocoder") and we exclude properties for which that ratio of land value to total value is smaller than 99%. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "i" decides to enter an oil and gas field "r" during year "t" to start developing resources, and 0 otherwise. The variable of interest CEO's Personal $\text{Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas field "r" during year "t", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available fields as all the fields that have active oil and gas exploration and production. For example, if drilling activity in field **A** starts in 2007, then we construct the panel data such that field **A** becomes an investment opportunity available to firms starting in 2007, and the field is not included in the sample during prior years. Once a firm enters a field, we drop that field from the sample for that specific firm. Finally, Distance from HQ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The t-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Enter}_{i,r,t} = 1$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(β_1) CEO's Personal $\text{Investment}_{i,r,t}$	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**	0.04**
	(2.56)	(2.49)	(2.58)	(2.49)	(2.46)	(2.38)	(2.35)	(2.23)
(β_2) Field's Oil-to-Gas $\text{Ratio}_{r,t}$	-0.00**	-0.00*	-0.00	-0.00	-0.00***	0.00	0.00	
	(-2.52)	(-1.83)	(-0.06)	(-1.22)	(-4.20)	(1.31)	(1.28)	
(β_3) Investment $\text{Level}_{i,t}$	0.26***	0.10**	0.26***	0.10**	0.26***	0.09		
	(11.84)	(2.00)	(11.76)	(2.04)	(11.90)	(1.64)		
(β_4) Field's Drilling $\text{Activity}_{r,t}$	0.11***	0.11***	0.12***	0.11***	0.06***	0.06***	0.06***	
	(9.70)	(9.63)	(9.88)	(9.65)	(3.92)	(4.08)	(4.06)	
(β_5) Field's Distance from $\text{HQ}_{i,r,t}$	-0.01**	-0.02***	-0.01**	-0.02***	-0.01*	-0.04***	-0.04***	-0.04***
	(-2.37)	(-7.50)	(-2.36)	(-7.31)	(-1.90)	(-6.77)	(-6.74)	(-6.00)
Firm FE	No	Yes	No	No	No	Yes	No	No
Year FE	No	No	Yes	No	No	Yes	No	No
CEO FE	No	No	No	Yes	No	Yes	Yes	No
Field FE	No	No	No	No	Yes	Yes	Yes	No
Firm*Year FE	No	No	No	No	No	No	Yes	Yes
Field*Year FE	No	No	No	No	No	No	No	Yes
CEO*State FE	No	No	No	No	No	No	No	Yes
R^2	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.04
F-Statistics	52.08	32.66	50.94	33.33	34.10	14.26	17.56	20.29
No. Obs.	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,733	2,455,726	2,455,726

TABLE A.4

CEO Properties and the Hazard Rate of Firm Entry into Oil and Gas Fields

This table studies the decision of firms to enter a field depending on having the CEO owning plots of land located on oil and gas fields using a Cox hazard model. The dependent variable, $Enter_{i,r,t}$, is a dummy variable equal to 1 if firm "i" decides to enter an oil and gas field "r" during year "t" to start developing resources, and 0 otherwise. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas field "r" during year "t", and 0 otherwise. The sample period is from 2000 to 2020. For each firm, we define the opportunity set of available fields as all the fields that have active oil and gas exploration and production. For example, if drilling activity in field **A** starts in 2007, then we construct the panel data such that field **A** becomes an investment opportunity available to firms starting in 2007, and the field is not included in the sample during prior years. Once a firm enters a field, we drop that field from the sample for that specific firm. Finally, $\text{Field's Distance from HQ}$ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The z-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Enter}_{i,r,t} = 1$
	(1)
(β_1) CEO's Personal $\text{Investment}_{i,r,t}$	2.10***
	(4.67)
(β_2) Field's Oil-to-Gas $\text{Ratio}_{r,t}$	-0.27*
	(-1.92)
(β_3) Investment $\text{Level}_{i,t}$	28.78***
	(9.43)
(β_4) Field's Drilling $\text{Activity}_{r,t}$	10.49***
	(20.45)
(β_5) Field's Distance from $\text{HQ}_{i,r,t}$	-6.61***
	(-3.73)
No. Obs.	2,093,263

Table A.5

Managerial Slack and CEO Pet Projects: Evidence from High vs Low Oil Prices

This table studies how high prices affects CEOs decision to divert firms' resources to drilled and explore oil and gas formation adjacent to their personal properties using OLS and Probit regressions. The dependent variable, $\text{Agency}_{i,t}$= 1, if in a given year the CEO allocates firms resources to drill next to his property. The key dependent variable, $\text{High Prices}_{i,t}$, is a dummy variable equal to 1 if oil prices are above the sample median, and 0 otherwise. Finally, Distance from HQ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. The sample period is from 2000 to 2020. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The *t*-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	OLS				Probit	
	$\text{Agency}_{i,t}$= 1					
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) $\text{High Prices}_{i,t}$	0.02**	0.01**	0.02**	0.01**	0.25**	0.20**
	(2.09)	(2.00)	(2.59)	(2.41)	(2.35)	(2.01)
(β_2) $\text{Investment Level}_{i,t}$		0.00		0.00		0.00**
		(1.38)		(1.57)		(2.10)
Firm FE	No	No	Yes	Yes	No	No
R^2	0.00	0.01	0.56	0.56		
F-Statistics	4.38	2.33	6.71	3.50		
No. Obs.	3,201	3,201	3,195	3,195	3,201	3,201

TABLE A.6

CEO Investment Properties and Firm Exit from Oil and Gas Fields

This table studies the decision of firms to enter a field depending on having the CEO owning plots of land located on oil and gas field using a linear probability model. The dependent variable, $Exit_{i,r,t}$, is a dummy variable equal to 1 if firm "i" decides to exit an oil and gas field "r" during year "t", and 0 otherwise. The variable of interest $\text{CEO's Personal Investment}_{i,r,t}$ is a dummy variable equal to 1 if the CEO of firm "i" possess a plot of land on an oil and gas field "r" during year "t", and 0 otherwise. The sample period is from 2000 to 2020. For each firm-field, we identify an exit when the firm has not drilled any wells in the field for a period of at least 2 years. Once a firm exits a field, we drop that field from the sample for that specific firm. Finally, $\text{Field's Distance from HQ}$ is a continuous variable measuring the distance between a field and the firm's headquarters in kilometers. Variable definitions and sample selection criteria appear in Appendixes 1 and 2, respectively. The t-statistics (in parenthesis) are based on standard errors that are heteroskedasticity consistent and clustered at the firm level. Significance levels are shown as follows: * = 10%, ** = 5%, *** = 1%.

	$\text{Exit}_{i,r,t} = 1$					
	(1)	(2)	(3)	(4)	(5)	(6)
(β_1) $\text{CEO's Personal Investment}_{i,r,t}$	-0.21***	-0.21***	-0.23***	-0.11**	-0.10**	-0.11***
	(-4.53)	(-5.19)	(-5.94)	(-2.19)	(-2.39)	(-2.71)
(β_2) $\text{Field Oil-to-Gas Ratio}_{i,r,t}$	0.00	-0.09***	-0.09***	0.00	-0.09***	-0.09***
	(0.00)	(-5.49)	(-5.69)	(0.11)	(-5.49)	(-5.63)
(β_3) $\text{Field Avg. Prod. Value}_{i,r,t}$	-0.00***	-0.02***	-0.02***	-0.00***	-0.02***	-0.02***
	(-3.08)	(-14.74)	(-15.01)	(-2.88)	(-15.23)	(-15.44)
(β_4) $\text{Investment Level}_{i,t}$				1.04**	0.09	0.27
				(2.30)	(0.23)	(0.69)
(β_5) $\text{Field's Drilling Activity}_{r,t}$				-1.66***	-1.85***	-1.83***
				(-18.85)	(-18.72)	(-18.32)
(β_6) $\text{Field's Distance from HQ}_{i,r,t}$				0.02	0.03	0.08
				(0.18)	(0.20)	(0.52)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	No	Yes	Yes
CEO FE	No	No	Yes	No	No	Yes
R^2	0.04	0.13	0.14	0.06	0.14	0.15
F-Statistics	9.48	112.97	111.11	71.77	113.01	110.65
No. Obs.	30,663	30,663	30,653	30,635	30,635	30,625